THE IRON AGE

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The Result of a Motor Truck Experiment

How Commercial Vehicles Successfully Adopted to Replace a Railroad Service Developed Into Suburban Freight and Express Carriers

A remarkable example of the successful establishment of a motor truck service for the industrial establishment is obtained in the experience of the leather belting institution of the Estate of E. R. Ladew, at Glen Cove, Long Island, N. Y. Though started largely to gain satisfactory delivery to its New York City headquarters, about 35 miles away, the decision to try the motor truck came as a result of an inability on the part of the company to obtain what it regarded as fair steam railroad freight rates and proper despatch in making shipments in severe winter weather. It did not expect, as was shortly proved to be the case, that by getting its products into New York City the same day they left the factory, no less than 36 hours would be saved in reaching Chicago; and soon from serving merely the Ladew factory needs, other factories, but principally merchants in towns along and near the routes followed by the truck, sought the company's assistance in the matter of carrying package freight on the return trips from New York to the factory. Before long additional trucks were added, making three all told; a separate company was formed to take care of the growing transportation business, and the trucks now move on established time schedules, work under published rate schedules and receive and deliver merchandise for points lying between Oyster Bay, N. Y., and New York City.

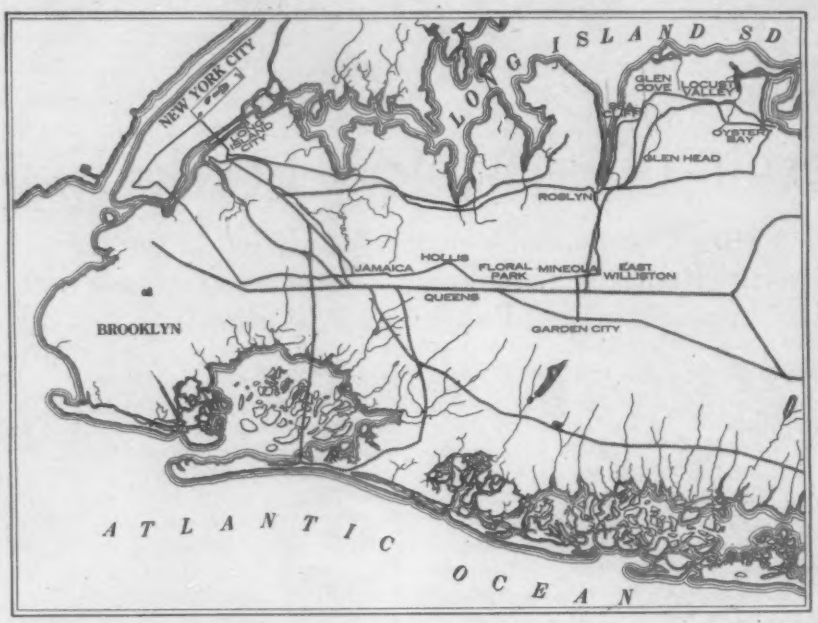
The Three Motor Trucks Now in Service

The specially interesting fact about the transportation business which developed (it might be said, without effort and without intention on the part of the company) is that not only does it cost the company less for shipping its material, not to mention the saving in time referred to, but the use of the motor trucks has proved a source of profit allowing for the justifiable formation of what is known as the Glen Cove Transportation Company. This statement is based on records which have been kept on the operating cost of the automobiles, including interest on the investment, depreciation and insurance. These figures have been translated, for the interest they will have, in terms or on the basis of the former freight cost which the use of the motor trucks displaces. It will be noted from the percentage figures as here tabulated that the total operating cost amounts to 94.6 per cent of the total amount paid in one year for freight, the tabulation referring, of course, to one year's operating costs. While there have been other years in which the freight cost may have been less so that the total yearly cost for operating the motor trucks would be greater than this freight cost, it is to be remembered that the motor truck freight delivery shows a profit. In fact, the Glen Cove Transportation Company is able to accept shipments to New York City from the Estate of E. R. Ladew at a lower rate than could be secured from the steam railroad. What the gross receipts are or what the profits figure out to be have, of course, no direct bearing on the present account of the successful inauguration and interesting outcome of a somewhat unassuming flirtation with the commercial motor vehicle.

At this writing three automobiles are operated, being a 3½-ton Packard bought in January, 1911, and running about 12½ miles an hour. The other two are a Benz - Gaggenau truck rated at 5 tons at a speed of 15 miles an hour and a 5-ton Alco car having a maximum speed of 8 to 9 miles an hour. As ordinarily operated the heavy trucks make the round trips to New York each day, covering about 70 miles in each case, while the third car is engaged in making the lighter or local deliveries covering about 30 miles a day. The merchants and householders in the various towns and communities commonly provide for purchases, say in New York City, to be sent to the company's headquarters, 82 Fulton street, New York, where they may be collected and delivered to the house or store of the consignee on the return trip of the truck. In certain periods of the year much of the work performed by the trucks is the moving of furniture and besides freighting to New York City; the trucks may take a somewhat longer course and deliver to desired points in Brooklyn. As an additional service a horse truck is used in New York City. The cost of upkeep of this truck is not charged against the motor transportation business, as the horse truck was formerly maintained and is still a requirement of the New York warehouse of the Ladew establishment.

The accompanying map will indicate something of the territory covered. It includes service to Jamaica, East Williston, Garden City, Roslyn, Oyster Bay, Mineola, Lo-

cust Valley and other nearby points. Some idea of the charges may be obtained from the following extracts from the schedule of rates, which is: 25c. per 100 lb. to a consignee in or near the towns mentioned and others nearby from the Fulton street warehouse and 50c. elsewhere on Long Island within 30 miles of New York and not over 30 miles from Glen Cove. Goods for delivery to Glen Cove are called for and delivered to the factory from places below Sixtieth street, New York City, for 25c. per 100 lb. and from points in Brooklyn at the same rate and from points in New York above Sixtieth street for 50c. per 100 lb. For delivery from the towns on route to Brooklyn and New York below Sixtieth street, the charge is higher, being 50c. per 100 lb. and to points above Sixtieth street in New York 75c. per 100 lb. For collection at points on route for delivery to other points on route the charge is 35c. per 100 lb. These prices give some idea of the strong competition which the motor truck service must be giving to express business in the immediate territory covered.



Map Showing Some of the Towns on the Automobile Freight and Express Service Routes

Referring to the table of operating costs, it may be stated that depreciation is figured on a five-year life for the 3½-ton truck and a four year life for the others, thus writing off 20 per cent. in the one case and 25 per cent. in the others. Interest is figured at 6 per cent. The cost of labor covers a driver and helper for each car. The garage cost is small, partly as the machines are housed in a part of one of the buildings of the Ladew factory, though it is believed that an equitable charge is made as regards this item. The repair cost is of course the actual expense involved in upkeep. The insurance item covers not only insurance for fire, theft of machines and liability insurance, but also a policy on the floating contents of the trucks. In comparing the relative percentages of the cost items, it should be added that the three cars are believed to average together about 170 miles daily for 305 days in the year.

Yearly Operating Cost of Motor Trucks Based on the Annual Cost of Steam Railroad Freight Which They Now Handle

Depreciation	16.3 per cent.
Interest	6.3 per cent.
Labor	36.7 per cent.
Gasoline and oil	12.6 per cent.
Rental of garage	1. per cent.
Repairs	12.6 per cent.
Insurance	9.1 per cent.

The Glen Cove Transportation Company is operated under the managership of A. J. W. Hyde, under the general supervision of James R. Taylor, manager of the Estate of E. R. Ladew. Shipments are made and the business generally is conducted after the manner of a publicly recognized general service corporation, waybills of a distinguishing color being sent to consignees, drivers taking receipts on corresponding blanks and a receipt book, for example, being carried by the truck driver for goods picked up en route.

The Folvert Carbureter Company, Youngstown, Ohio, has been organized with a capital stock of $70,000, and will make a specialty of a patented carbureter invented by D. F. Folvert of Cleveland. A factory will be located in Youngstown on which work will be started in a short time.

Standards for Flanged Pipe Fittings

A Standard Now Adopted by Valve and Fitting Manufacturers Different from That Recommended by Engineers and Pipe Fitting Contractors

The fact that the 1912 U. S. standard for flanged fittings and flanges is not approved by all interests is emphasized by the announcement of the manufacturers' standard adopted July 10 and effective October 1, 1912. It has already been explained in these columns how a committee of the American Society of Mechanical Engineers, working with a committee of the National Association of Master Steam and Hot Water Fitters, adopted a schedule given the name of the 1912 U. S. standard, this standard also receiving the support of a committee on the subject appointed by the American Society of Heating and Ventilating Engineers. Then, in *The Iron Age* of July 18, was mentioned at some length some reason for the lack of agreement, this reference to the subject appearing shortly after a hearing given by a division of the Navy Department in Washington. Now have been learned particulars regarding the manufacturers' standard and also of the Washington hearing. The manufacturers' statement, issued by W. H. Douglas, secretary of the committee of manufacturers on standardization of fittings and valves, 30 Church street, New York, is given below substantially in full, followed by excerpts from the Washington hearing:

Explanation of the Manufacturers' Standard

Any standard to be commercially successful must be designed to bring about the desired uniformity with the minimum inconvenience and expense, both to the consumers and to manufacturers. Before the 1912 U. S. standard was adopted by the two societies mentioned there existed among the majority of manufacturers in the United States a generally accepted standard for flanged fittings and flanges. Most of the large flanged fittings manufacturers in this country had the entire pattern equipment necessary to build this line of goods and many had list prices and dimensions published for general distribution to the trade; in fact, these dimensions have been published in Kent's Pocket Book, Eighth Edition.

After having thoroughly investigated the conditions which induced the two societies to adopt the 1912 U. S. standard, the manufacturers of flanged fittings and flanges throughout the country realized that certain changes in the generally accepted standard were desirable. The tendency of modern engineers to use higher steam working pressures than was their practice some years ago has demonstrated the necessity for an increase in the strength of extra heavy end flange bolting in the larger sizes. In drafting up the 1912 U. S. standard the American Society of Mechanical Engineers provided an increase in the bolting of large extra heavy flanges; but this increase seems out of proportion with the necessities of steam engineering practice. The manufacturers have, therefore, adopted a happy medium and have increased the bolting on these extra heavy flanges, but have been more practical in this increase than the 1912 U. S. standard.

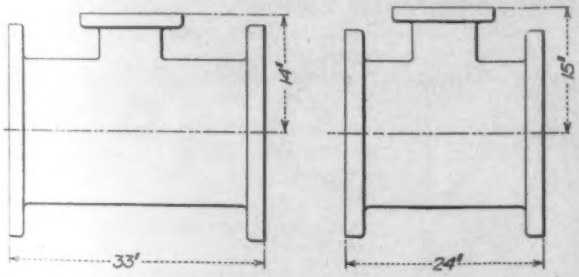
So far as the strength of the fittings themselves, not considering the bolting, is concerned, the 1912 U. S. standard has no advantage whatever over the manufacturers' standard. While the 1912 U. S. standard provides larger center to face dimensions on many straight sizes, this change was not brought about by any attempt to better the fittings, but was an average of several published sets of dimensions which in many cases were out of date and

did not correspond with the goods being made by the respective manufacturers. This change alone would require a large expenditure for patterns and shop equipment, without a commensurate advantage to the consumers.

The increase in bolting in the manufacturers' standard compares very favorably with the table of dimensions on "A Standard for High Pressure Steam Lines," issued by the Society of German Engineers in 1900; also the report issued by the Engineering Standards Committee on British standard tables of pipe flanges. While the 1912 U. S. standard provides much heavier bolting on the very large extra heavy flanges, this excessive increase does not seem necessary, as the manufacturers' standard bolting is just as strong as the 1912 U. S. standard on the sizes which include the great majority of pipe lines, namely, the 10-in. size and smaller.

The manufacturers' standard is much more economical for the consumer of the future in avoiding mistakes when making changes and additions to his plant, as no change is made in the center to face dimensions from the present manufacturers' standard. This standard is also economical for the manufacturer, as he can use his present equipment, which, to a large extent, is made up in very substantial fashion and cannot be changed without involving a very high expenditure. Furthermore, the 1912 U. S. standard will naturally create a great deal of confusion to the consumer, jobber and manufacturer alike, as it would necessitate carrying two stocks of fittings for several years or until the new standard is fully in effect. The manufacturers' standard will not cause this difficulty.

The manufacturers' standard for reducing fittings is a much better design than the 1912 U. S. standard, as the fittings are more in proportion with the straight sizes. The 1912 U. S. standard has the same dimensions on the run of reducing fittings as the straight sizes, regardless of reduction. It will be readily seen that the proportions of a reducing fitting will not be in harmony with those of a straight fitting. This is brought out by the illustrations,



1912 U. S. Standard Manufacturers' Standard

Drawings Showing the Relative Proportions of Flanged Fittings Designed According to the Two Standards

which show a fitting drawn to the same scale, using the manufacturers' standard and the 1912 U. S. standard.

To sum up the situation, it is quite apparent that the manufacturers' standard has all the merits of the 1912 U. S. standard without the disadvantages. While the opinions of some engineers may be in favor of heavier bolting on the larger extra heavy flanges, it does not seem consistent or necessary with present steam engineering practice. It would seem apparent that the excessively large bolt diameters specified in the 1912 U. S. standard for the larger flanges are much too cumbersome and inconvenient from the steam fitters' standpoint, while the bolt sizes specified in the manufacturers' standard are more in accordance with general practice. In a standard of this nature convenience as well as strength should be a governing factor.

We feel confident that the public at large will express their preference for the manufacturers' standard, and while the manufacturers may be accused of not taking an interest in the 1912 U. S. standard from its inception, their recent action in adopting a universal standard, which is fully in accord with the requirements of the engineering trade, will demonstrate that they are acting with absolute sincerity and with a fair-minded attitude toward all interests involved.

Views Expressed at the Government Hearing

H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company and chairman of the committee of the American Society of Mechanical Engineers, spoke in part as follows on the flange standard hearing before the Navy Department: "In our three principal plants we use no standard fittings whatever; we have our own standard and always have had. The Walworth Mfg. Company and the Best Mfg. Company have made our fittings, and they have been to our own standard. They are heavier than any others. We have never had any trouble having manufacturers get out our work using our own standard, an experience covering possibly twelve years. Another member of our committee, Mr. Sparrow, who represents the New York Edison Company, states they also have their own standards, which have been maintained for twelve years, and incidentally I would remark that it is not a bad idea to buy fittings by the pound.

"We had a number of nasty accidents which shook our faith in our standard. In losing a number of flanges we rarely ever are able to use the same bolts over again. We came to the conclusion that they were overstressed. I started my chief draftsman and engineer on an investigation, from which we concluded that we had no conception before of the enormous strain developed. We thought possibly the foreign societies, the German Society, and the English Society, must have experimented, and we found they had apparently adopted standards which are very similar. We went over these and examined them and found they were too light. We found in the November, 1911, Bulletin of the Société Industrielle de Mulhouse, page 290, the following quotation:

"'It is nearly impossible to estimate with any degree of precision the bending stresses to which pipe flanges are subjected, when, in order to obtain a good joint, the bolts are screwed tightly, especially if the flange has to withstand at the same time stresses due to expansion. As a result many of the joints in pipes and similar apparatus are working with very low factors of safety, as have been shown lately by the fact that accidents from piping have been far more numerous than from boilers and with as fatal consequences.'

"We gave flanges and bolts to a number of steam fitters, four or five, to pull up, so arranged that the strain could be measured. We found that the operation of the wrench gave an initial stress corresponding to about 29,000 lb. per sq. in. The average bolt material had an ultimate stress not to exceed 60,000 lb. per sq. in., therefore showing the existence of a factor of safety of only 2 in small sizes, more or less. From these facts and from our experience in losing bolts and flanges, we came to the conclusion that the steam pressure strain was practically of no importance. The only method was to increase the diameter of the bolts. It was found that with the bolt selected the bolt diameter had to be increased in order to accommodate the hexagonal head.

"I find in comparing all different standards, manufacturers' standard, British standard and German standard, that the 1912 U. S. standard is much heavier and stronger than any of the others. The German standard as well as the British standard has been criticised, and from our investigation we concluded it was unsafe. From the point of view of the manufacturers it is unfortunate that it should be necessary to make new patterns on the extra heavy fittings, but we consider we have to pay for special fittings in any case. There is one point we are unprotected against and that is steam pipe. I have seen one or two cases of a 6-in. main breaking, a flange bonnet blowing off, and I don't want to see any more of them. For the comparatively small amount involved, calling for extra heavy fittings, to our company it means nothing, one-half of one per cent. on the investment of new machinery, and if anyone can show me how we can make it any safer I would adopt it at the present time. Everyone uses 200 lb. pressure nowadays on superheat, and it is much harder to handle, because it does not remain constant.

"Another point in straight run fittings: the face to face dimensions should be the same, which would allow of changing the fittings without changing the pipe line. If one had a 14 x 6-in. tee and wished to change for a 14 x 8-in. tee he could do so; there would be no change in the face dimensions."

The Comptoirs Financier Franco-Canadian Company of Paris has applied to the Montreal Board of Control for permission to construct in Montreal a complete system of electric underground railroad. All the capital, which will amount to $100,000,000, will be provided by French banks. The permanent company will be formed as soon as the provisional one has received the necessary authority from the city and from the Legislature.

Methods of Sampling Steel Billets

Investigation to Ascertain What Samples Are Calculated to Give a Conveniently Obtained and Reliable Analysis

BY C. W. DANFORTH, YOUNGSTOWN, OHIO

A few years ago the writer had occasion to sample and analyze a considerable number of small Bessemer billets. Realizing that segregation causes much difficulty in procuring representative samples, care was taken to drill well into the steel but to not pass farther than the middle with the point of the drill. Drillings were analyzed for phosphorus and sulphur. In most cases results were reasonably close to the expected analysis, but numerous samples ran high in phosphorus or in sulphur, or in both. There were probably as many analyses too low as there were analyses too high, though not so evident. Furthermore, duplicate determinations sometimes failed to agree, sulphur being the most troublesome in this respect. Judging from his previous Bessemer experience, the writer felt that the steel in question was more uniform than was being shown. From the working of the steel in the mill it was deduced that the phosphorus was higher than normal, but not so high as some analyses tended to show.

Table 1—Analysis of Drillings from Billet

Position of Hole	Mang.	Phos.	Sul.
Drilled in side	...	0.136	0.067
Cross section	...	.118	.073
1	0.44	.171	.117
2	.43	.168	.117
3	.43	.177	.127
4	.42	.157	.104
5	.43	.147	.098
6	.42	.128	.081
7	.44	.173	.127
8	.43	.120	.073
9	.43	.167	.112
10	.44	.120	.086
11	.42	.067	.038
12	.43	.103	.068
13	.43	.073	.042

An investigation was then undertaken to devise some procedure whereby a true sample might be procured. It was at first thought that a special-shaped drilling tool with a shoulder allowing an exact depth of penetration, and a point dressed to some definite angle, might furnish a proper sample. The distortion of most small billets from a square section precludes the use of such a device. Another reason prevents its employment; the maximum lines of phosphorus and sulphur do not exactly coincide and one or both metalloids may not segregate to the exact center. Some experiments were made with a high-speed milling saw in the attempt to get a sample of a true cross-section. No real success was attained, though it may have been possible to overcome the difficulties which were encountered. Furthermore, the expense was likely to be heavier than in the method finally adopted.

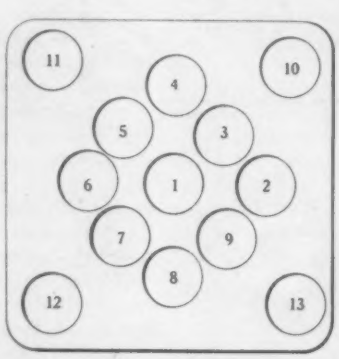


Diagram Showing Location of Borings

A 1¾-in. Bessemer billet drilled as carefully as possible in the center line of one side ¾ in. deep with a ⅝-in. twist drill gave on analysis: Phosphorus, 0.136; sulphur, 0.067. This billet was taken to a shaper and a perfect cross-section was planed out with a tool which gave particles of uniform size, care being taken that no pieces were lost. This sample was taken about 3 in. from the drill hole. Analysis of planings yielded: Phosphorus, 0.118; sulphur, 0.073, which bore out our expectations. As these results proved our drilled sample much too high in phosphorus and too low in sulphur, it was desired to test for the distribution of the impurities. Accordingly, a 5/16-in. drill was selected and 13 holes bored in the planed end, numbered as shown in the sketch.

Table 1 is a tabulation of the analyses of these 13 samples of drillings. Evidently No. 1 sample did not catch the most highly segregated part either as to phosphorus or sulphur. It is interesting to note in this badly segregated section the absence of segregation of manganese. Nos. 3, 5, 7 and 9 are a little closer to No. 1 than to Nos. 10, 11, 12 and 13. An average of the figures has no value, as more of the middle part of the section is represented than of the remainder.

Another 1¾-in. Bessemer billet, drilled as before and as carefully as possible with a ⅝-in. drill, showed: Carbon, 0.10; manganese, 0.47; phosphorus, 0.118; sulphur, 0.074. From the working of the steel this analysis appeared reasonable. A cross-section sample near the drill hole showed: Carbon, 0.10; manganese, 0.48; phosphorus, 0.114; sulphur, 0.073. Investigation was made to ascertain if segregation in this case were small or if our ordinary drilled sample were a lucky hit. Table 2 is a record of the 13 samples taken in the positions shown in the cut.

Table 2—Analysis of Drillings of a Second Specimen

Position of Hole	Color Carbon	Mang.	Phos.	Sul.
Drilled in side	0.10	0.47	0.118	0.074
Cross section	.09	.48	.114	.073
1	.21 (Comb.)	.44	.219	.171
2	.09	.43	.109	.065
3	.10	.42	.121	.076
4	.095	.43	.116	.073
5	.09	.42	.110	.068
6	.09	.47	.115	.072
7	.10	.42	.128	.085
8	.09	.46	.115	.074
9	.09	.42	.109	.067
10	.09	.54	.108	.067
11	.09	.54	.104	.064
12	.09	.52	.109	.069
13	.09	.53	.106	.065

Sample No. 1 comprised the high phosphorus and the high sulphur portion. While not much variation in carbon was expected, No. 1 was surprising in this particular. No. 1 carbon is by combustion, closely checking the color test, showing no perceptible amount of graphite. Manganese results show considerable segregation in the opposite direction to sulphur.

It was considered that cross-section planings furnished the correct sample at that particular place in the billet; but the question arose, "Can this test be in any way conclusive that the heat itself is off specifications?" As opportunity presented itself to investigate this phase in open hearth steel, an acid open hearth ingot weighing approximately 1600 lb. with phosphorus content slightly higher than ordinary Bessemer steel was selected. The heat test analyzed carbon, 0.11; manganese, 0.44; phosphorus, 0.116; sulphur, 0.050. This ingot was rolled out, after cropping, into 150 ft. of 1¾-in. billets. Tests were taken every 10 ft., affording, with first and last ends, 16 samples. Cross-section planings were made analyzing as in Table 3.

Only first and last sections vary to any considerable degree from the average. If averages be taken, allowing the first and last samples half weights, phosphorus and sulphur become respectively 0.111 and 0.048. When one considers that the top of the ingot is cropped heavier than the bottom, and that percentage variation from the mean

Table 3—Analysis of Billets from an Acid Open Hearth Ingot

Sample	Color Carbon	Mang.	Phos.	Sul.
Heat test	0.11	0.44	0.116	0.050
1 top	.11	.44	.129	.058
2	.11	.44	.117	.051
3	.11	.44	.115	.051
4	.11	.44	.112	.050
5	.11	.44	.111	.050
6	.11	.44	.112	.048
7	.11	.44	.113	.049
8	.11	.44	.110	.048
9	.10	.44	.108	.048
10	.10	.44	.109	.048
11	.11	.44	.108	.046
12	.105	.45	.107	.046
13	.10	.44	.108	.046
14	.11	.43	.109	.046
15	.10	.44	.108	.046
16 bottom	.10	.43	.101	.043

is so much greater in the top than in the bottom, these averages are gratifying by reason of their being about 4 per cent. under the heat analysis.

Here again, in the preparation of the sample from the heat test, regard must be had for segregation. The writer's method of drilling heat tests has been elsewhere stated, with reasons for its adoption. No. 2 section practically checks the heat test. Ordinarily these billets would have been sheared into 30-ft. lengths. Considering the first 30 ft., a test taken at the first end would have shown analysis as No. 1; a sample taken from last end would have given analysis as in No. 4; a sample from the middle must have shown phosphorus, 0.116; sulphur, 0.051. There are not sufficient data here to show exactly what the real average is, but it must be close to: Phosphorus, 0.119; sulphur, 0.053.

The first, sixth, eleventh and sixteenth sections were examined as before by drilling in the ends. Results of analyses appear in Table 4, which is interesting in showing variation in carbon in a low carbon steel. Manganese is quite uniform, but has a tendency to segregate with sulphur.

An analyst used to working on basic steel will almost unconsciously select the finer portion of his sample for sulphur determination, by reason of the easier solubility of such steel in nitric acid than in hydrochloric. The finer portion, coming from the bottom of the drill hole, explains why a second determination for sulphur generally yields a lower result when analyzing a badly segregated sample. In one instance 0.088 was a first result, while the duplicate gave 0.077. It is common practice to use a 0.2 gram charge for color carbon determination, and 0.2 or even 0.1 gram for manganese. It is evident that in highly segregated samples larger charges would be better. Our planed samples comprising small uniform particles caused no trouble whatever in duplicating results.

Table 4—Analysis of Billets from Acid Open Hearth Ingot

Billet No. 1

Sample	Comb. Carbon	Mang.	Phos.	Sul.
1 center	0.142	0.46	0.159	0.075
2	.125	.46	.150	.066
3	.125	.46	.144	.067
4	.133	.46	.144	.059
5	.141	.46	.154	.072
6	.136	.46	.152	.066
7	.123	.46	.141	.061
8	.120	.46	.140	.056
9	.143	.46	.151	.069
10	.101	.45	.107	.046
11	.115	.45	.125	.054
12	.117	.44	.099	.040
13	.110	.44	.117	.050

Billet No. 6

Sample	Comb. Carbon	Mang.	Phos.	Sul.
1 center	0.156	0.45	0.148	0.070
2	.125	.46	.119	.051
3	.120	.45	.131	.062
4	.100	.45	.128	.056
5	.130	.45	.144	.064
6	.107	.45	.107	.045
7	.104	.45	.106	.049
8	.113	.45	.120	.055
9	.095	.44	.110	.047
10	.085	.45	.091	.040
11	.080	.44	.105	.048
12	.080	.45	.092	.039
13	.094	.44	.099	.042

Billet No. 11

Sample	Comb. Carbon	Mang.	Phos.	Sul.
1 center	0.120	0.46	0.140	0.068
2	.110	.45	.125	.055
3	.123	.46	.129	.061
4	.123	.46	.121	.054
5	.118	.46	.135	.065
6	.108	.46	.121	.055
7	.094	.46	.125	.049
8	.093	.46	.106	.048
9	.118	.46	.106	.045
10	.085	.44	.080	.034
11	.086	.44	.101	.045
12	.073	.44	.080	.032
13	.103	.45	.117	.052

Billet No. 16

Sample	Comb. Carbon	Mang.	Phos.	Sul.
1 center	0.111	0.45	0.110	0.047
2	.120	.45	.121	.051
3	.110	.45	.120	.050
4	.110	.45	.113	.049
5	.110	.45	.122	.052
6	.105	.44	.090	.036
7	.102	.44	.104	.041
8	.102	.44	.115	.049
9	.090	.44	.097	.038
10	.088	.43	.084	.033
11	.094	.43	.091	.035
12	.101	.43	.086	.033
13	.085	.43	.081	.032

At one time it was the practice at a large steel works to sample blooms and large billets by drilling in the end. Results were very uncertain until care was taken to divide the end into four equal parts and drill as near as possible in the center of one. This method is by no means perfect. If the piece were sheared cold (in other works, broken), such a procedure might be good, if the section were sufficiently large. Hot shearing is simply a pushing of one section past its adjacent section with accompanying distortion, the longitudinal direction becoming at the immediate ends nearly transverse, necessitating a considerable penetration before the desired part of the bloom is reached.

Physical tests also check variations in analysis between the top and the bottom of the ingot. Table 5 is a record of analyses and tension tests on strip steel 1 11/16 x 0.051 in. rolled from a basic ingot.

Table 5—Analysis of Samples of Strip Steel

	Sample	Carb.	Mang.	Phos.	Sul.	Per Cent Elong. per 8 in.	Tensile Strength, lb. per sq. in.
1	From top of ingot.	0.10	0.44	0.019	0.051	26.6	58,400
2	From top of ingot.	.10	.45	.019	.050		
3	From bottom of ingot	.09	.48	.014	.038	26.1	55,600
4	From bottom of ingot	.09	.48	.015	.036		
5	From bottom of ingot	.09	.47	.014	.031		

To prepare all billet samples on a shaper may seem a big order to the chemist not fitted up for such work. On the contrary, the thing works out very nicely. Four samples can be prepared per hour by one man, which is about the speed with which one man can make the analyses on the four determinations. All analytical work in these investigations was carefully done, many determinations being duplicated and triplicated, utmost pains being taken to arrive at comparative results. The writer is indebted to W. P. Samuels for very consistent and accurate determinations of carbon by combustion.

Summary

All ordinary grades of steel segregate to a greater or less extent, and unless due cognizance of this fact be taken many analyses will be worthless and misleading.

A true sample which will be representative of the billet at that particular place can be economically made by means of a shaper.

By investigation along the lines laid down in this article any given grade and class of steel billets can probably be shown to be off specifications when such is the case.

The enormous variation in analysis in a small area warrants the use of larger charges for determinations (especially for color carbon and manganese) and the procuring of samples consisting of finer particles.

The Grace Steamships

In the placing of contracts with the William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., for four steamers, W. R. Grace & Co., New York, have made extensive plans for the development of the coast-to-coast trade upon the opening of the Panama Canal. These steamers will be of 10,000 tons each, 405 ft. long and 54 ft. beam. Upon their completion about July, 1913, a fortnightly sailing service will be inaugurated between New York and San Francisco from each port. With the addition of the three steamers now building in England and destined for the New York and South American west coast trade, via the Straits of Magellan, the fleet of Grace & Co. will number 16 steamers. The steamers under the British flag will be operated by the New York & Pacific Steamship Company, which is controlled by Grace & Co.

The recent action of the firm in the matter of American ship construction is expected to do much to stimulate the shipbuilding industry, hampered as it is by wages 50 per cent. higher than those paid in British yards. And in connection with proposed free tolls for coastwise native shipping, it is an indication of the possibilities of expansion of trade awaiting American bottoms.

One statement in *The Iron Age* of August 8, in the article referring to the starting up of the new by-product coke plant at South Bethlehem, Pa., might lead to the inference that the entire output goes to the Bethlehem Steel Company. The Lehigh Coke Company informs us that when the plant is in full operation it will have several thousand tons of coke per day for sale in the open market.

New Four-Spindle Boring Machine

The Automatic Machine Company's Product for Boring and Surfacing Engine Cylinders and for Similar Work—Details of the Drive and Feed Mechanism

The Automatic Machine Company, Bridgeport, Conn., has constructed from its own designs a four-spindle vertical boring machine which bores and faces engine cylinders ranging from 4 to 10 in. in diameter and having a maximum depth of 24 in. or other similar work. The purpose in building this machine was to procure a tool that would do the required work with such great precision that grinding would be unnecessary and at the same time to insure an economy of labor by utilizing the entire time of one operator with a single machine. The speed of production is such that the man has time to remove a completed cylinder and set up another one while the other three heads are operating and in the meantime to make the necessary replacement of tools for the several operations on the work in progress. Front and end views of the machine are given in Figs. 1

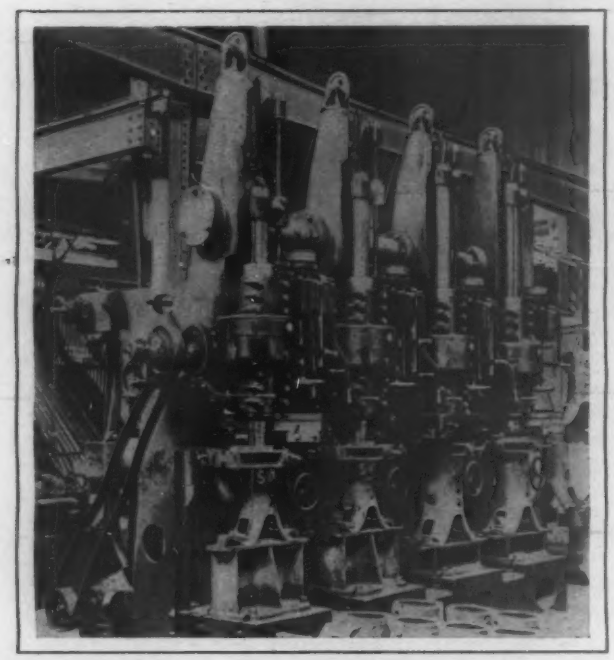


Fig. 1—Front View of a Four-Spindle Cylinder Boring and Surfacing Machine Built by the Automatic Machine Company, Bridgeport, Conn.

and 2 respectively, while the remaining engravings show the details of the various parts. Figs. 3, 4 and 5 give details of the driving and feeding mechanism, the driving clutch mechanism and the belt shifting mechanism respectively, the last being also shown in Fig. 2. An exterior view of the surfacing head showing the top of the feed rack plunger and the clutch is reproduced in Fig. 6, while details of the feed mechanism for this part are illustrated in Fig. 7.

The time required for boring and facing a cylinder 7½ in. in diameter and 18 in. deep to exact size is 1½ hr. With the four spindles, all of which are in operation a part of the time, the actual time per cylinder is less than 30 min. In the design of the machine the standard boring machine practice was adopted of rotating the cutter while the work is held stationary. As will be noticed from Figs. 1 and 2 the machine is of massive proportions, the estimated weight being something over 15 tons. The boring spindle is 4¾ in. in diameter and the other parts are proportionately heavy and powerful. Five changes of speed for the spindle are provided through the use of cone pulleys, while the same number of feed changes are available through the use of a feed box. A characteristic feature of the machine is convenience of operation, all the levers being easily reached from one position by the operator.

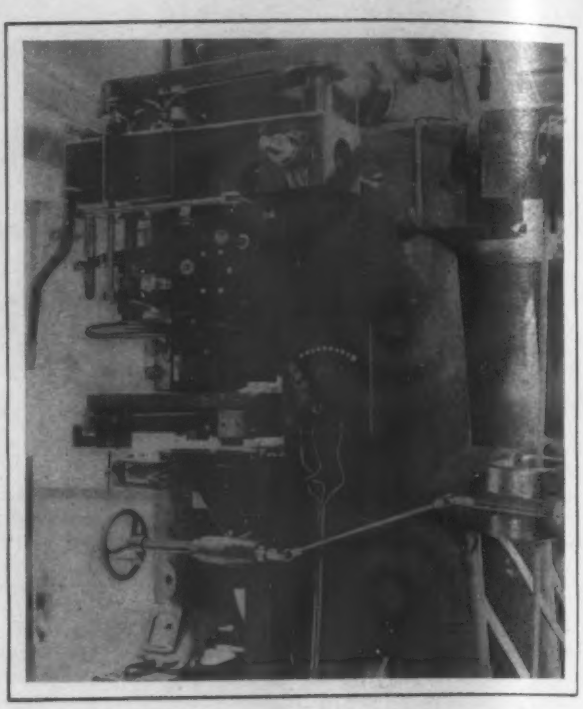


Fig. 2—End View of the Machine Showing the Feed Control and the Belt Shifting Mechanism

The cylinder boring is done in four operations, the roughing cut, the semi-finishing cut and two finishing cuts. The roughing operation is performed with four cutters in the head arranged in accordance with standard milling machine practice, so that each does its proportionate share

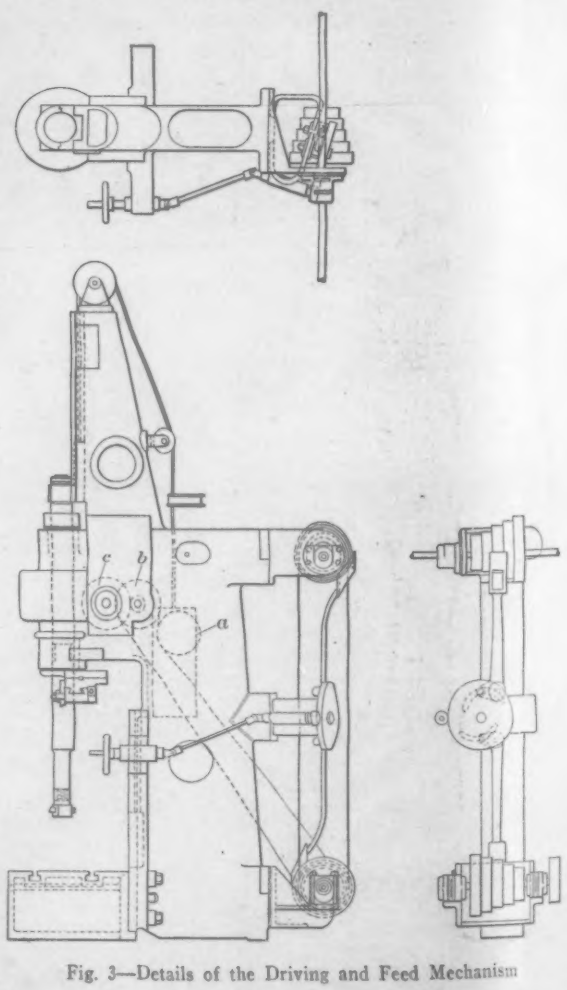


Fig. 3—Details of the Driving and Feed Mechanism

of the work. Before taking the semi-finishing cut, the No. 4 cutter is removed from the head and replaced by a counterbore cutter and the wall of the cylinder is machined to the depth required for clearance. The single-

end, semi-finishing cutter is then inserted in the No. 4 position and the operation of truing the hole completed, two cuts being taken with floating cutters. Formerly only

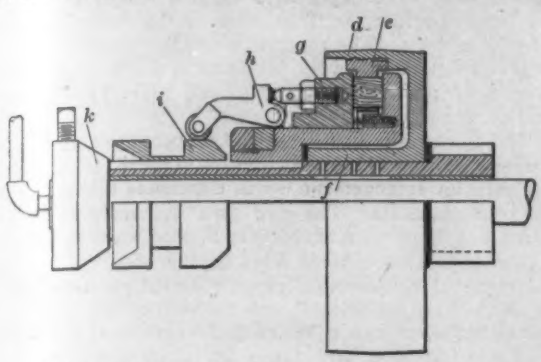


Fig. 4—Details of the Driving Clutch Mechanism

one finishing cut was taken, but it was found desirable to perform this reaming operation with a preliminary cut to insure greater evenness and accuracy, the results secured giving a discrepancy between the actual and specified finished dimensions of less than 0.001 in. in roundness and taper. The roughing cut of the face is taken simultaneously with that of the cylinder and it is finished at the same time as the semi-finishing of the cylinder.

The drive and feed mechanisms possess features of design which are of a great deal of interest. The drive is from a pulley on the countershaft through an endless belt kept taut by the tightener pulley *a*, Fig. 3, to a clutch pulley, *b*, integral with which is a 20-tooth pinion engaging with a 60-tooth gear, *c*, located on the worm spindle. The loose pulley *d*, Fig. 4, of the clutch pulley carries a disk, *e*, containing 18 hardwood plugs. This disk works between the cast-iron surfaces *f* and *g*, which are brought into engagement with the clutch by the knuckle joints *h* and the thimble *i* through the operation of the lever *j*, Fig. 5. Disengaging the clutch stops the spindle instantly since it is disconnected from the fast running heavy parts of the pulley and what slight momentum remains to be overcome is taken care of by a cone brake at *k*, Fig. 4. This constitutes an important advantage because complete control is given to the surfacing head in stopping it at the desired point of its rotation.

The feed mechanism which is driven by the worm *l*, Fig. 5, is located on the main driving spindle and meshes with the worm gear *m* on the feed driving spindle. A cone clutch, which is controlled by the lever *n*, and is held closed by a spring, serves to engage and disengage the drive. One motion of the lever engages the spring and the opposite one depresses the spring through a cam motion at the top of the feed box, thus releasing the clutch. Keyed to the feed shaft is a nest of five gears, any one of which may be brought into engagement by the lever *o* with its corresponding gear on the driven feed shaft to produce the desired feed, a diving key being employed for the purpose. Between each feed point of the quadrant there is a neutral point at which the gears are entirely out of mesh. The high speed feed for withdrawing the bar from the work is controlled for both up and down movement by the lever *p*, the action being to engage the double cone clutch which operates in conjunction with the three bevel gears at *g* to drive the pulley *r*. This is belted to the feed spindle at *s*, driving the feed screw. In this operation the lever *o* is set at one of the neutral positions.

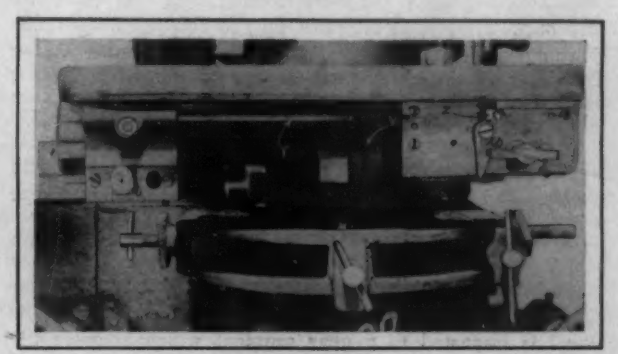


Fig. 6—The Surfacing Head Showing the Top of the Feed Rack Plunger and the Clutch

The construction of the surfacing head includes ingenious mechanical details as are brought out in Figs. 6 and 7. The feed rack plunger *t*, Fig. 7, engages a cam on the

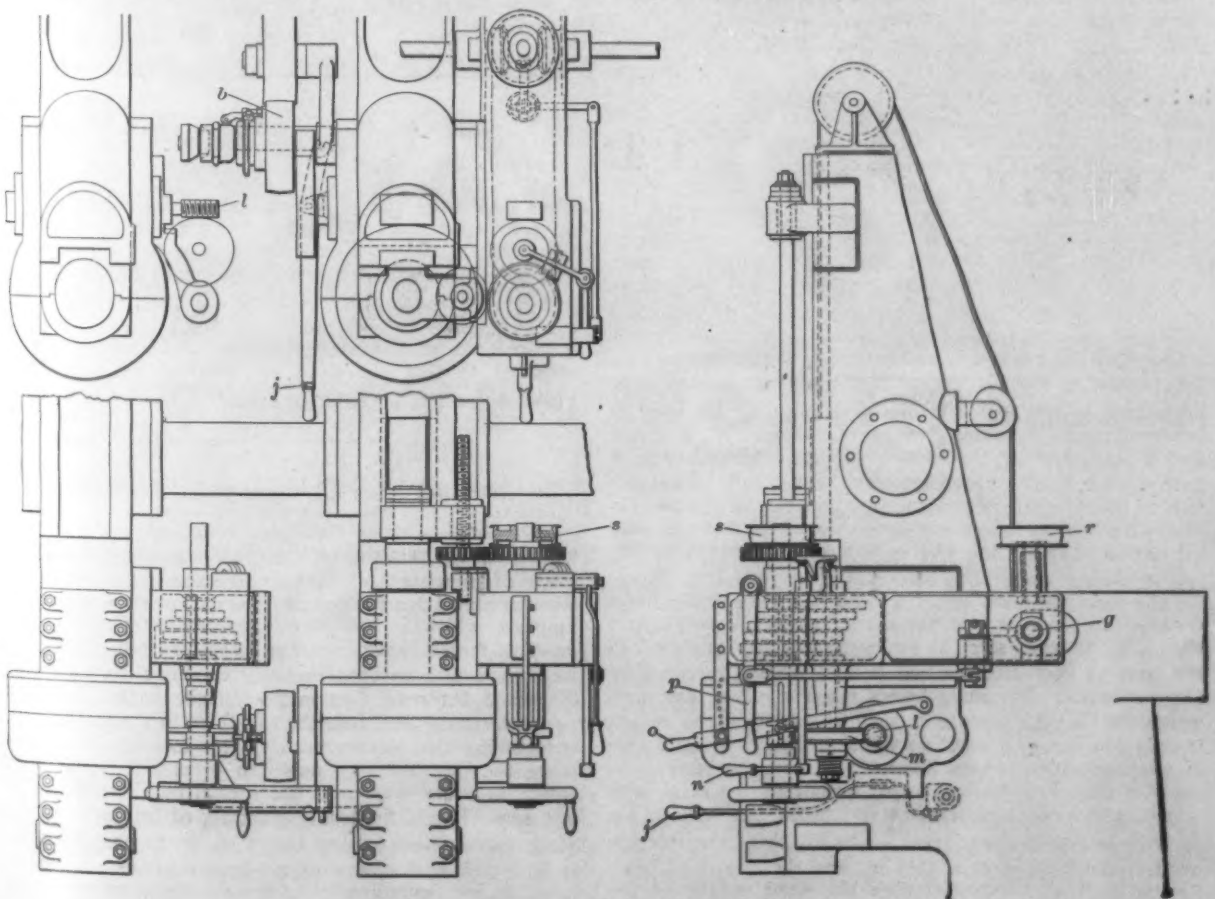


Fig. 5—Details of the Belt Shifting Mechanism

spindle housing at each revolution. The rack is spirally cut and engages the spiral gear *u* on the feed shaft. The action of the plunger is a dual one, giving the spindle both

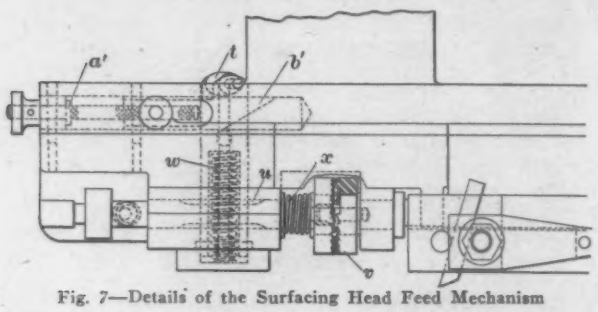


Fig. 7—Details of the Surfacing Head Feed Mechanism

end motion and rotation and thus engaging the clutch V. Fig. 6, and *v*, Fig. 7, and turning the feed screw at the same time. The plunger is returned to its former position by a coiled spring, *w*, located in its center, and this upward motion acting upon the spiral teeth causes the spindle to turn backward and at the same time to recede. This action disengages the clutch, the spring *x* assisting in the release. One half of the clutch acts as a ratchet wheel and the other half, which is secured to the spindle, operates as a pawl. The feed motion has an automatic knockout which may be set at any desired point by adjusting the rod Y, Fig. 6, to trip the latch Z. The amount of feed is regulated by the feed control screw *a*,' Fig. 7, which operates the wedge *b*.'

A convenient feature is the belt shifting mechanism which is shown in Figs. 2 and 3. This is controlled by a hand wheel conveniently located at the front of the machine at the side of each spindle. The motion of the wheel is imparted to a gear segment which actuates the shipper arm and causes the belt to ride from one step of the cone pulley to another as desired.

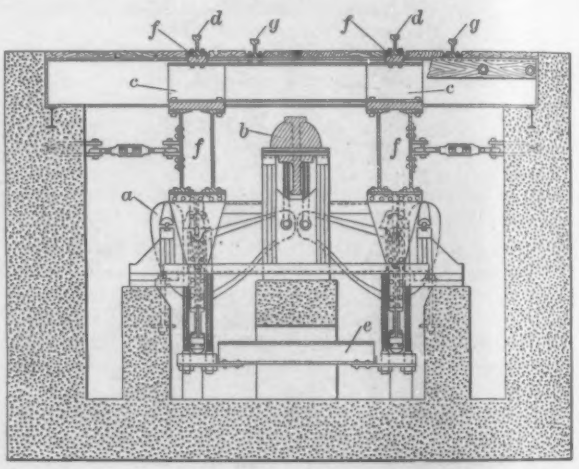
A New Platform Scale

An improved type of railroad scale with suspended platform and bridge ends has been recently brought out by the Standard Scale & Supply Company, Pittsburgh, Pa. This has been done to meet the demand of railroad companies and large manufacturing firms for track scales of greater capacity, durability and accuracy than have been required or built in the past. A cross-section of the 150-ton scale, which is typical of all of them, is reproduced in the accompanying drawing.

The foundation of this scale is 58 ft. long and the weighing platform is 50 ft. in length with a 4-ft. bridge at each end. If any future increase in the length of cars should be made the bridge at each end could be reduced to half its present length and the length of the weighing platform thus increased to 54 ft. without changing the scale. The foundation is reinforced by 6-in. beams 62 ft. long, running the full length of the foundation. The anchorage in the center of the scale of the fifth lever is rendered more substantial by using two 15-in. I-beams, and it is pointed out that concrete is not depended upon to take up the power concentrated at this point. The system of levers conforms to the best practice of the day, in that all cast-iron levers are proportioned to fiber stresses of 1500 lb. per sq. in., steel pivots 3700 lb. per lineal in. and structural material to 8000 lb. per sq. in.

The cast-iron main levers *a* furnished are suitable for a capacity of 200 tons and are made in the company's own shop. If desired, steel main levers can be furnished to conform to fiber stresses and bearing values specified by the purchaser. The main levers when made of cast iron weigh 670 lb. and when cast steel is employed the weight is only 200 lb. The middle extension lever *b* weighs 1340 lb., and the end extension lever 860 lb., these weights varying slightly. The total shipping weight of the scale with cast-iron levers is approximately 26,000 lb., and 22,300 lb. with cast-steel main levers. The length of the fulcrum pivot in the main lever is 11¼ in., and the total load bearing on each of these, including the dead weight of the platform, is approximately 42,500 lb. The maximum depth of the main lever casting when made in iron and steel is 21 and 13¾ in. respectively. The length is 35½ in. and the fulcrum is 8⅞ in. The dimensions of the middle extension lever are: depth 22½ in. and length 16 ft. The end extension lever is 18 in. deep at the deepest part and is 137½ in. long. The ratio of multiplication in the system of levers is: main levers, 4; extension lever, 12½; fifth lever, 6 2/3; shelf lever, 2 2/5, and beam 13½, giving a total of 10,800.

The platform is suspended and adjusted to accommodate minute variation of construction by vertical 1⅝-in. U bolts and nuts, an arrangement which eliminates timber ties and cast-iron pedestals. The live rails are fastened to steel beams and it is emphasized that in this way the rails are always kept at the same level at the ends of the scale. This type of construction gives a closed parallelogram in which the vertical sides absorb the weight and impact and the 12-in. beam ties *c* under the weigh rail *d* form the third closing side and the 6-in. beam ties *e* near the bottom of the pit complete the parallelogram. Cast-iron blocks *f* are interposed between the 24 and 12-in. I-beams and between the 12-in. I-beams at the weigh rail to give the clearance between the live and dead parts of the scale and construction. These blocks also act as lateral ties to the compression flanges of the 24-in. beams at the extreme fibers of the beams, thus superseding the old method of partial diaphragm between the webs in a few isolated places. Lateral ties for the tension flanges of



An Improved Type of Railroad Scale with Suspended Platform and Bridge Ends Built by the Standard Scale & Supply Company, Pittsburgh, Pa.

these beams are also provided, which it is emphasized avoid a weak spot in the construction. If a grade is required for the platform, the blocks can be made to suit it. Instead of box girders extending transversely across the pit for supporting the dead rail, *g*, beams of equal weight which can be painted on both sides are substituted. In this way it is pointed out a longer life is secured and less room is required so that the dead rail ties or I-beams can be placed 23 in. apart, center to center.

The Brown-Wales Company in New Quarters

The Brown-Wales Company, iron and steel merchant, announces the removal of its entire business, including the stock of merchandise, offices and show rooms, from the store occupied for the past 25 years to the new eight-story building which it has just completed at C, Fargo and Egmont streets, near Summer street, Boston, Mass. The location is directly opposite the New York, New Haven & Hartford Railroad Company's freight yard. The company's business has more than doubled in the last 15 years, outgrowing the old quarters. After looking for a better place the decision was made to erect a building which would in every way meet the special requirements of the business. It is a fireproof structure, of brick, cement and steel construction, having 13,250 sq. ft. to each floor, and is equipped with the most modern methods of handling merchandise, including three freight elevators and a passenger elevator. A spur track connection from the railroad above mentioned runs into the building.

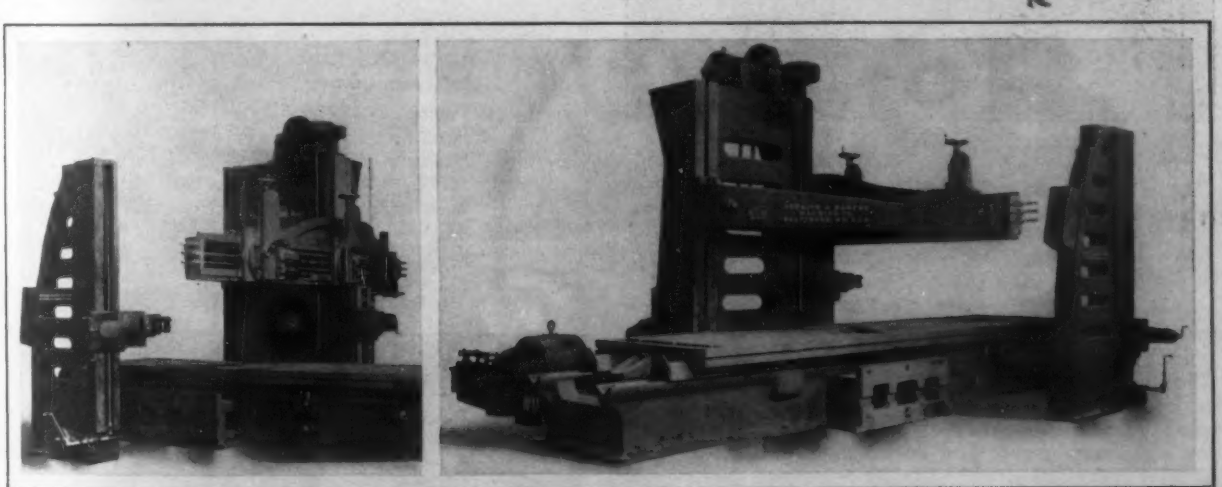
Convertible Open Side Planing Machine

The line of open side planing machines built by the Detrick & Harvey Machine Company, Baltimore Md., has been recently augmented by the addition of a convertible type which retains the same characteristics as the open side planing machine and also embodies the additional features of a double housing machine. It is not considered as a special machine, but is constructed with the idea of giving the same strength, rigidity, output and accuracy of operation as can be obtained in the regular double housing type, while still retaining the open side feature with its wide range and great adaptability. In this connection the supplementary housing is not intended to impart any additional strength or rigidity to the machine, but simply to carry the outer head, which is self-contained.

This housing is attached at the base on which a plate is cast and also at the cross rail end by heavy bolts, pockets in the base and rail end, giving the necessary rigidity and enabling the quick removal of the housing when work is to be done which will not pass between the housings. What is usually termed the cross rail in a double housing planing machine is replaced in the open side machine by an L-shaped casting consisting of a horizontal arm and a downward extending leg cast integral therewith. This type of construction is clearly shown at the right of the accompanying engraving. The leg has a bearing on the main housing, which is 50 per cent. longer vertically than the overhang of the cross beam. The cross beam is also supported at the rear by a triangular brace having a bearing on the main housing. This arrangement, it is emphasized, gives a rigidity to the cross beam that is not obtained in the ordinary type of double housing planing machine.

The side head on the operating side of the machine is not mounted on the housing, but on the downward projecting leg of the cross beam. In this way the final support of the tool is brought as close to the head as possible. The slide way is adjustable, and if at any time the cross rail heads and the side head get out of square they can be adjusted promptly and readily. With this sort of housing and the self-contained tool head, four heads, two on the cross rail and one on each side, can be operated simultaneously. The drive is of the Sellers spiral pinion type and employs only one gear train between the driving belt, or, as in the case of the machine illustrated, the driving motor and the tool. This drive consists of four bearings and three gears. The feed is of the positive friction type and power is thus consumed only when feeding the head. When an overload occurs the feed slips, thus protecting the tools.

The machine illustrated is a standard 72 x 72-in. x 18-ft. tool, which is driven by a direct-connected reversing motor as illustrated. In actual operation on open-hearth steel billets having a carbon content of 0.30 per cent. two cuts ¾ in. wide with a 3/16-in. feed can be made at the rate of 30 ft. per min. while on 0.80 per cent. carbon stock cuts of the same width with a 5/32-in. feed have been made at the same rate. The power consumption is about 50 hp. The weight of this machine exclusive of the motor is approximately 82,000 lb.



Two Views of a New Convertible Open Side Planing Machine Built by the Detrick & Harvey Machine Company, Baltimore, Md.

The First Case of Massachusetts Compensation

The first case of settlement for injuries under the new Massachusetts workingmen's compensation act was recently passed upon. It was filed July 17 with the newly appointed Industrial Accident Board, for an accident occurring at a manufacturing plant in Lawrence, Mass., July 5 which resulted in the death of the injured man, Joseph Braetenas, July 6. As the new law took effect July 1, it covered his case. Less than two weeks after the accident the case was settled by the decision that the family of the deceased should be paid $7.33 a week for the next six years. This weekly payment is the equivalent of one-half of the average weekly earnings of the head of the family.

In this connection there is an interesting feature. Braetenas' regular weekly wage was $13.50, but as a matter of fact he often worked overtime, earning in some instances $19.95 per week. Therefore the definition given in the law as to the "average weekly wages" of the injured employee came into use. This defines the "average weekly wages" as "the earnings of the injured employee during the 12 calendar months immediately preceding the date of injury, divided by 52; but if such injured employee lost more than two weeks' time during such period, then the earnings for the remainder of such 12 months shall be divided by the number of weeks remaining after the time so lost has been deducted." It was found that Braetenas lost during the year immediately preceding the accident 228 5/6 hours, or 3.81 weeks. Hence Braetenas worked 48.18 weeks and his average weekly earnings under the act were $14.66.

The first case under the new law proved to be especially interesting, for the reason that it put into effect one of the most important provisions of the act—that defining the meaning of "average weekly wage." A feature, too, is the promptness with which the case was settled, demonstrating the justness of the claim of the originators and advocates of this legislation that it would do away with protracted litigation and attendant heavy charges.

Prospectors and investors are stated to have recently been showing great interest in a brown iron ore district in the vicinity of Alexander, Ga., which has been made available through the building of a new railroad. The Alexander Land Company has been formed for the purpose of promoting a town site and this company also has the disposition of several thousand acres of ore-bearing land. Names of various prominent Northern and Southern business men are mentioned as among those investigating the deposits.

The Columbus Iron & Steel Company, Columbus, Ohio, will blow in its second furnace August 20.

Electric Furnace Pig Iron*

A Microscopic Study of a California Product of Rare Purity

A sample of pig iron was recently received from the Noble Electric Steel Company, which was made in an electric furnace at their plant at Heroult, Shasta County, Cal. The ore used in the production of this iron shows the following analysis:

Ore from Which the Iron Was Made.

Fe	69.9	per cent.
Fe_3O_4	89.4	per cent.
Fe_2O_3	7.3	per cent.
MnO	0.18	per cent.
MgO	0.30	per cent.
SiO	2.40	per cent.
P	0.011	per cent.
S	0.009	per cent.

From a hand examination of the sample, and as judged by its fracture, the iron as compared to Pittsburgh iron would be graded at No. 3 foundry iron, that is, a close-grained iron, less open-grained than a No. 2 iron, and still less than a No. 1 iron. A photograph of the fracture of this iron, actual size, is shown in Fig. 1. Fig. 2 shows the same fracture as slightly over two diameters.

Fig. 1—Photograph of a Fracture of the Iron

A microscopical examination was made of a section of this sample, as shown in Figs. 3 and 4. In Fig. 3 is shown the sample unetched at 100 diameters. In the photomicrograph the black areas represent the graphitic carbon and the white background the ferrite and combined carbon, if any of the latter is present. In Fig. 4 is shown the same area as is shown in Fig. 3 after etching with 10 per cent. nitric acid and alcohol for about one and a half minutes. The junction lines of the ferrite grains are distinctly revealed, the small additional dark areas which appear representing pearlite areas. From an examination of these two specimens, etched and unetched, we are able to predict the constitution and physical properties that may be expected of such an iron.

For example: In the first place we note that the carbon is practically all in the graphitic form, there being present not over 0.05 per cent. of combined carbon. We also note the absence of the phosphide eutectic, which indicates that the iron is practically free from phosphorus. Also, by reason of the carbon being present almost entirely in the graphitic form, we are led to believe that the manganese and sulphur content of the iron are very low and the silicon content comparatively high. That this is true is shown by the chemical analysis of the iron subsequently made:

Chemical Analysis of the Iron.

Si	3.64	per cent.
S	0.00	per cent.
P	0.02	per cent.
Combined carbon	0.00	per cent.
Total carbon	3.58	per cent.
Mn	0.00	per cent.

The properties of such an iron, that is, one practically free from sulphur, phosphorus and manganese, have not, so far as we are aware, been studied due to the fact that pig iron of such purity is rarely produced. We are therefore only able to judge of the physical properties of such iron by noting the influence of the elements we find present upon iron *per se*, for, as has been shown by Howe, although one element may exert a very decided influence of itself upon the physical properties of iron, yet when in combination with others its effect is entirely different. In this case we have practically no other element present except iron, carbon and silicon, and hence have only one element to consider, namely, silicon.

*D. A. Lyon and F. C. Langenbeg in Metallurgical and Chemical Engineering.

Fig. 2—The Fracture of Fig. 1 at Two Diameters

In order to study the influence of this element upon iron, Turner,* in 1885, prepared an iron by heating wrought iron and charcoal in closed crucibles. This was then remelted with a silicon pig, containing about 10 per cent. silicon, in proportions necessary to yield any desired composition. However, the phosphorus content was in some cases as high as 0.32 per cent., and the manganese present in the most extreme cases was 1.95 per cent. Sulphur varied from 0.05 to 0.03 per cent. Therefore the irons compounded by Turner were in no instance as free from impurities as the iron under consideration, and hence we are unable to state by analogy what the principal properties of the latter should be.

The influence of silicon on the physical properties of cast iron has also been studied by W. J. Keep† and many others. Keep found that a small addition of silicon to white iron eliminates blowholes and produces soundness, while a further addition of that element gives the greatest crushing strength. He also observed that silicon in excess of that required to give the greatest crushing strength diminishes brittleness and yields the greatest transverse and tensile strength. This is, of course, due to the fact that silicon of itself has a tendency to cause whatever car-

Journal Chem. Soc., 1885, p. 577.
†Am. Inst. Min'g Engs., 1888.

Fig. 3—The Sample Unetched at 100 Diameters

bon may be present in the iron to assume the graphitic form. As might naturally be inferred from the manner in which the graphite is distributed throughout the iron, the strength of the matrix is necessarily less than would be the case if the graphite particles were not interspersed throughout it.

Turner in his investigations of the influence of silicon upon the properties of cast iron arrived at conclusions similar to those of Keep. Turner obtained maximum hardness with an iron containing less than 0.8 per cent. of silicon, maximum crushing strength was about 0 8 per cent., and greatest tensile strength with about 1.8 per cent. He also found that an iron possesses the softest and best working qualities when its silicon content is about 2.5 per cent. But it is to be remembered that he performed his tests on iron containing appreciable amounts of manganese and phosphorus.

From the start it has been the aim of the Noble Electric Steel Company to produce an iron which would best meet the requirements of the Pacific Coast foundries. In order to understand what these requirements are we may state that scrap cast iron is largely employed for making all grades of castings, and that the sulphur, phosphorus and combined carbon content of the same is very often so high as to impart very undesirable qualities to the finished product. For this reason the Pacific Coast foundrymen have been in need of an iron high in graphitic carbon and silicon and low in other impurities.

From the analysis given above it may be seen that the pig iron made in the electric furnace in California is of that nature. It is, therefore, apparent that if a foundryman using this iron understands the effects of phosphorus, manganese, sulphur, and especially silicon, upon the physical properties of iron he may by an intelligent mixing of this electric furnace pig iron with scrap cast iron, based upon actual analyses of the latter, obtain an iron in which the predominating physical property shall be the one most desired or a combination of physical properties best suited to meet the requirements.

Due to the fact that this electric furnace pig iron is practically free from phosphorus, sulphur and manganese, while the irons used by Turner and Keep in their investigations contained appreciable quantities of other substances, the writers are of the opinion that a study of the former along lines similar to those pursued by Turner and Keep and Paglianti* will result in furnishing additional data on this subject. They are planning to conduct such an investigation in the very near future and hope to be able to supplement the data which has already been obtained on this subject by Turner, Keep and others.

*Metallurgie, 1911, 9, 217-230.

Fig. 4—The Same Area as in Fig. 3 After Etching

The Krupp Centenary Celebration

At Essen, Germany, the past week the centenary of the great Krupp works has been celebrated in an imposing manner. On Wednesday, August 7, announcement was made that the Fried Krupp Aktien Gesellschaft, as the company is now styled, had donated 14,000,000 marks ($3,500,000) to be distributed as gratuities to the 70,000 workmen, as welfare funds for citizens of Essen, and for the army and navy. On the following day Emperor William arrived at Essen by special train, accompanied by a large retinue, including his brother, Prince Henry of Prussia, to participate in the celebration. Dr. Von Bethmann-Hollweg, the Imperial Chancellor, many other ministers and officials, and military and naval officers were also present. The city was in gala attire.

After the Emperor had been welcomed by the Mayor and the Municipal Councillors he proceeded to the administrative buildings, where Gustav Krupp von Bohlen-Halbach, the head of the company, welcomed him in a speech to which the Emperor responded, extolling the achievements of the Krupp cannon and the Krupp battleships, which, he said, "hammered out German unity on the battlefield and carried the German flag throughout the world." He then said that the achievements of the Krupps in peaceful fields were even more noteworthy, praising particularly the work of the company in settling the problems of workmen's insurance and pensions, continuation schools, etc., in which direction it had shown the way for the social-political legislation of Germany. He asked all present to join in three cheers for the company. He then honored Dr. von Bohlen-Halbach by making him a Minister Extraordinary.

More than 800 employees who had seen more than twenty-five years of service received decorations and money gifts. Of the distribution of 14,000,000 marks, 3,000,000 was given directly to workmen and officials, the latter receiving a month's salary and the former 5 to 100 marks, according to their length of service, and the remainder is given in part as follows: Five million marks for investment to afford a fund to give the older employees a vacation with pay; 1,000,000 for a pension fund for officials, 1,000,000 for women and children, 2,000,000 to Essen, with the provision that 1,000,000 thereof must be used for a museum of art, 500,000 thereof for playgrounds, and the other 500,000 for free beds in hospitals, etc., for all needy citizens of Essen, and 2,000,000 for athletic grounds and institutions for the army and navy.

Frederick Alfred Krupp, grandson of the founder, who died in 1903, directed in his will that the firm should be changed into a stock company. This was done, but Bertha Krupp, his daughter, who married Dr. von Bohlen-Halbach, holds all but four shares of this company. She is not only Germany's wealthiest woman but its wealthiest subject and greatest taxpayer.

Heavy Foreign Shipment of Pipe.—The recent opening of the Connellsville extension of the Western Maryland Railroad, which, with its own lines and connection with the New York Central, provides another outlet from Pittsburgh to seaboard, was marked by the shipment of 50 cars of pipe by the National Tube Company from its National Works at McKeesport, Pa. The train was taken over the tracks of the Pittsburgh, McKeesport & Youghiogheny Railroad, which is controlled by the New York Central, thence over the Western Maryland via Hagerstown, Md., connecting later with the Philadelphia & Reading and by the Central Railroad of New Jersey reaching Jersey City, at which point the pipe was loaded for foreign shipment. The pipe was consigned to Kobe, Japan, to Honolulu, London, Copenhagen and the City of Mexico, while 10 of the cars were for New York City proper. A number of officials of the National Tube Company and of the railroads hauling the shipment were present when the train was started on its trip. This new route to the seaboard will be of great value to Pittsburgh. It is said to be 50 miles shorter than one of the existing trunk line routes from Pittsburgh to the East.

The Republic Rubber Company, Youngstown, Ohio, has increased its capital stock from $4,000,000 to $10,000,000.

Engine Efficiency Reckoner

A Device for Use in Connection with an Engine Cylinder Indicator

For giving immediately the mean indicated efficiency of steam, Diesel and gas engines, pumps, compressors, etc., by simply reading off a counting instrument and multiplying by an apparatus constant, Herman Bachrach, 722 Lewis Block, Pittsburgh, Pa., is offering the Maihak indicator fitted with Bottcher's efficiency reckoner. With this instrument, it is pointed out that the intervals between the readings can be fixed by the engineer at will and the manipulation of the apparatus is also simple. The apparatus can be put on the machine in any position and it is not necessary to place it perpendicularly on the drum. Every stroke of the engine is taken account of and thus every diagram taken in the cylinder is counted. Control diagrams can be taken at any time and no taking of single diagrams and no measuring with the planimeter are necessary.

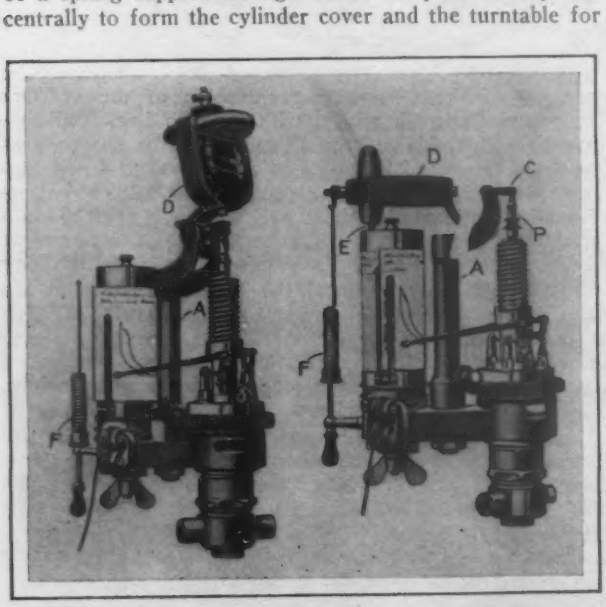
The ordinary procedure when an indicator is used to establish the mean indicated efficiency of any kind of piston engine is to take diagrams every 10 to 20 min., and use the efficiency calculated from these cards as the basis for further tests. This arrangement is open to the objection that constant changes are occurring in the load on the engine. Notable examples of this are the engines in cement mills, hauling engines, rolling mill engines and locomotives. With but few exceptions in the case of explosive engines even with unchanged load there is a strong development of fluctuating lines which, of course, tends to impair the accuracy of the results secured. It is emphasized that the use of the efficiency reckoner does away with this trouble.

The reckoner constructed in connection with the Maihak indicator is supported on a pillar, A. The counting roller E, located in the frame D on the upper front surface of the indicator drum is pushed radially against the drum by the piston rod P of the indicator, which transmits its power through the curved lever C. A calibrated spring, F, presses the roller against the upper surface with a definite adhesion pressure. An endless worm is carried by the axis of the roller E, and transmits the movement of rotation to a counting mechanism equipped with spur gears. In this way it is possible to make extended experiments. The unrolled arc of the circumference of the counting roller is in exact proportion to the mean indicated pressure and is, therefore, equal to the mean indicated efficiency. If desired, the indicator can be used without the reckoner and while the apparatus is counting diagrams can be taken.

The indicator with which this reckoner is used possesses a number of distinctive features. Among these is the use of a spring support through which the piston rod passes centrally to form the cylinder cover and the turntable for the pencil linkwork as well. This support is short and is not affected by heat. It is also slotted to make the connection between the rod and the linkwork, and since there is no relative motion between the piston rod and the pin, one of the chief difficulties encountered with the indicator, lost motion due to wear at the wrist pin, is claimed to be thus overcome.

The spring employed is of the standard Crosby type with the important difference that it is arranged to operate in tension instead of compression. It is pointed out that springs of the latter type are apt to buckle and cause excessive friction between the piston rod and the guide. The two spirals forming the spring are screwed into a base which is formed in two parts and a rigid fastening is provided. This method of fixing the spring, it is emphasized, insures a definite length of spring and alterations in its length occur only between the point at which it is fastened and the upper end. The coils are also closely wound and the diameter of the spring is large in comparison with its length. This spring is screwed to its support and a ball at its upper end passes into the bifurcated end of the piston rod. A small cap is then screwed into place at the top of the ball and the spring and the piston rod then virtually become a rigid unit. Air circulates freely between the cover and the liner and under normal circumstances insulates the spring but as a further protection a plate of vulcanite is fixed on the underside of the spring support. The pencil mechanism is supported on a base and turns through a relatively small angle, the amount of movement being regulated by the width of the slot in the spring support. A small handle provided with a lock nut enables the pressure of the pencil on the card to be adjusted.

The paper drum is of a special type and the spiral control spring is a special feature. All the drums have a double cord race so that two indicators can be coupled together and operated by a common reducing linkwork. A patent friction clutch is employed to do away with the trouble frequently encountered by connecting the cord to the reducing motion. This clutch is controlled by a knurled pin on the top of the drum. In this way the cord race is driven continuously by the indicating motion and is connected to the drum when the operator wishes to take a diagram. The piston is ordinarily made of steel, but if desired an aluminum one can be furnished. For indicating high pressures, as for example, those encountered in internal combustion engine work and in certain types of air compressors, a smaller piston and a liner can be fitted to the instrument. The pencil lever is designed from the Crosby pattern and has a magnifying ratio of 6 to 1. It is made in one piece and is bifurcated to pass around the spring support. The motion from the piston is transmitted to the lever through a rod and connecting link which is guaranteed to give a practically straight-line motion.



Two Views of the Maihak Indicator Equipped with Böttchers Efficiency Reckoner for Giving the Mean Indicated Efficiency of Steam and Gas Engines Directly

The New National Chamber of Commerce

The Chamber of Commerce of the United States of America has established its headquarters in the Riggs Building, Washington, D. C. The statement is made that though the Chamber was organized as recently as April 22, more than 77,000 business men of the nation are now affiliated with it through 102 different organizations covering 29 individual States and the Hawaiian Islands. The Chamber of Commerce of Boston, Mass., with 4609 members, is the greatest. The detail work of the Chamber is being carried on by the following men: General secretary, Elliot H. Goodwin, formerly secretary of the National Civil Service Reform League; field secretary, Edward F. Trefz, formerly advertising counselor to the Painted Display Advertising Association of the United States; assistant secretary, D. A. Skinner, formerly assistant chief, Bureau of Manufactures, Department of Commerce and Labor; chief of editorial division and editor of the Nation's Business, G. Grosvenor Dawe, formerly managing director of the Southern Commercial Congress.

The Arguto Oilless Bearing Company, Wayne Junction, Philadelphia, Pa., is distributing to the trade an exceptionally well finished 14-in. brass edged ruler, on the reverse side of which are named the various classes of machinery to which Arguto bearings are applicable.

Pyrometry for Iron and Steel Works

Difficulties Due to Unreliable Instruments and Severe Usage Under Works Conditions—Experience with Resistance Thermometers and Optical Pyrometers

S. H. Stupakoff, Pittsburgh, who has written a number of papers and articles on pyrometers and their use in metallurgical processes, read a paper on "Practical Pyrometry in the Iron and Steel Industries" before the mechanical section of the Engineers' Society of Western Pennsylvania, which is given in the society's Proceedings for July. Portions of the paper were reproductions of what was presented in papers Mr. Stupakoff prepared for the American Foundrymen's Association in 1904, 1908 and 1911, so that in the present article only a few extracts will be given, together with the discussion of the paper, in which the author participated. After dealing with blast furnace pyrometry, Mr. Stupakoff gave an explanation of the action of thermo-electric couples when applied under different conditions for the measurement of high temperatures. Among the thermo-electric pyrometers in use were mentioned combinations of pure platinum and platinum alloyed with 10 per cent. of iridium, platinum-iridium and ruthenium, nickel and constantan, iron and constantan, copper and constantan, nickel and steel, silver and constantan, iron and copper and combinations of various alloy steels.

Optical Pyrometers

Some attention was given by the author in the latter part of his paper to resistance thermometers and to optical and heat radiation pyrometers. The range of the first named, as recommended by conservative manufacturers, lies between the absolute zero—273 deg. C. and 700 deg. C. for industrial purposes. Concerning optical and radiation pyrometers the author comments as follows:

"The only instruments which can be used for measuring temperatures higher than 3000 deg. F. are optical and radiation pyrometers. They are applied at a distance and not directly exposed to the source of heat like those which have just been described. All materials, not excepting refractories which are used as protection shields of pyrometers of the thermo-electric and resistance type, are more or less seriously affected by direct exposure to high temperatures. Not only do they lose most of their desirable qualities, as for instance that of impermeability to gases, but frequently they form chemical compounds with the enclosed platinum wires, thus destroying the vital portions of the pyrometer and oftentimes being completely destroyed through the action of fluxing agents. Difficulties of this nature are entirely avoided when optical or radiation pyrometers are used.

"For shop practice, however, such instruments must combine with this good quality simplicity of construction. They should be suitable to be handled by ordinarily intelligent workmen and it should be possible to apply them under the most adverse and varying factory conditions. To my knowledge at the present time there is not a single optical pyrometer to be had which fully covers all these requirements. In most optical pyrometers the light emitted by a heated body is compared with a standard light, which in some cases is an amy-acetate flame of certain hight, or a small electric incandescent lamp, the current for which is usually furnished by a storage battery.

"While it cannot be denied that with the use of optical means very satisfactory results can be obtained in a laboratory, it is an extremely difficult matter to adjust such instruments in manufacturing establishments where temperature readings must, as a rule, be taken on very short notice. Further, it is well known that the results always depend upon the personality of the observer and upon the conditions of the surroundings. It is, therefore, to be recommended if optical pyrometers are used in the works, that they be left in the hands of one man only who may be able to obtain results which agree after he has become accustomed to the use of the instrument. It is not possible to make optical pyrometers self-recording.

Radiation Pyrometers

"Heat radiation pyrometers are self-contained instruments which give indications or records independent of the observer. As is done with optical pyrometers, the telescope of radiation pyrometers is pointed at the source of heat which is to be measured. The heat which is radiated from the hot body is then collected by a suitable mirror secured within the telescope and concentrated at the focus of this mirror upon a sensitive thermo-couple. The free ends of these thermo-couples are then connected in the ordinary manner to either a recording or indicating instrument. One instrument is on the market in which a very delicate compound spring, not much larger than a pin head, takes the place of this thermo-couple. It operates on the principle of expansion pyrometers.

"No batteries or other accessories are necessary in connection with the use of radiation pyrometers. They give very good results if properly handled and used with reasonable care. It is preferable to use instruments of this description in Bessemer and open-hearth furnace practice. They may also be applied successfully in air furnace, crucible and cupola practice. In the last, however, it is usually preferable to use thermo-electric pyrometers.

Casting Temperatures

"Iron and steel, copper, brass, bronze and other alloys as well as the white metals, and in fact all metallic substances or combinations of metals are very susceptible to varying casting temperatures. This is a subject which deserves far more attention in actual practice than it usually receives. The erratic behavior of castings can generally be traced to the temperature at which they were poured from the ladle into the mold. The cause of many mysterious fractures of steel of high ductility lies frequently in the original ingot which has been cast at either too high or too low a temperature. Bronze bearings and babbitt metals cast from the same heat often show remarkably different qualities. Steam or hydraulic fittings, which have to be of close texture to withstand the pressure test to which they are submitted, fail frequently through being hopelessly porous; while others, taken from the same lot, may fully meet the severest set of specifications. We have many convincing proofs that castings of identical chemical composition may turn out to be entirely different in their physical or mechanical properties. In looking for the reason of this apparently strange behavior, we find an analogy in the difference of the micro structures, which is disclosed to us by their examination under the microscope. Percy Longmuir demonstrated some seven or eight years ago by a series of carefully made tests, that a 'fair' casting temperature exists for all metals and alloys at which they represent the most desirable physical qualities, which outlive any subsequent heat treatment to which they may be subjected.

"When pouring our metals we have good reasons to distinguish between high, fair and low temperatures. The difference is not due to changes in chemical composition. Loss of zinc is always determined by the highest temperature, as the fumes given off present the zinc oxide formed on heating. There remains no doubt that the variations in the mechanical properties of our metals and alloys are solely determined by variations in their initial casting temperatures, and it can be accepted as a general rule that:

"High casting temperatures give a loose structure.

"Fair casting temperatures give an interlocked structure.

"Low casting temperature gives a sharp structure.

Pyrometry in Galvanizing

"Considerable difficulty is encountered in galvanizing practice to keep the temperature of the molten metal within the limits which produce a clean and uniform coating on the surface of articles treated by this process. The most

suitable galvanizing temperature lies usually about 50 deg. F. above the melting point of the metal bath. Ten or fifteen degrees either way may result in inferior products. The melting point of pure zinc is 787 deg. F. Impurities or other metals such as lead, antimony, aluminum, etc., intentionally added, or accidentally occurring in the mixture, usually lower the melting point; and in such a case it will be found preferable to lower the galvanizing temperature accordingly. This makes us conclude that the temperatures of galvanizing baths require close watching.

"We receive indisputable indications of the conditions of the fluid metal in galvanizing practice through the formation of dross, the degree of intensity of its coloring, the behavior of the flux, the intricate motions on the skimmed, clean surface of the metal accompanied by the appearance of variously shaped crystals, like ice crystals on a window pane, and most of all, through the appearance of the metallic coating of the galvanized products themselves.

"They may remain forever an enigma to the uninitiated, whereas a man who has spent a lifetime at this task may have finally mastered the problem. Nevertheless it is not a rare occurrence that a galvanizing tank in the hands of an expert operator gives out after a few months; and replacing it is always a very costly matter. The cause in 99 cases in 100 is overheating the metal.

"A friend, who has had wide experience in galvanizing practice, assured me that he had tried many heat measuring instruments during the last 20 years, and that not one had given satisfaction. Some failed because they were too fragile, others because they were unreliable from the beginning, some because they were inconstant and changing in time, and still others because they were erratic in their indications. These last, which undoubtedly embrace the majority of instruments of the kind, are the least tolerable of the lot. Instead of imparting confidence they give just cause for distrust and they invite ridicule of the workingmen to whom they are represented as infallible. I have often run against freaks of this kind. Few of them would indicate the correct temperature within 50 or 100 deg. Some would run along smoothly for a while, and then drop 300 or 400 deg. within half or three-quarters of an hour and rising again as quickly. What faith could a man have in such an erratic indicating device, if he knows that a tank containing from 10 to 15 tons of molten zinc will not cool more than 19 or 20 deg. F. per hour with all the fires turned off?

"The question is often asked whether reliable test thermometers can be obtained for the purpose. Undoubtedly, they are to be had, but there should be no occasion to use them for checking other instruments of their kind, if such convenient and reliable means can be used as the freezing point of the metal itself. We have no reason to find fault with our commercial thermometers. The better grade can be relied upon to be correct within one-half of a division, even without a certificate; but most confusing results can be obtained with a thermometer, especially with a long stem thermometer, if it is not correctly used. Ordinarily commercial thermometers are graduated to be used at full immersion; that is, not only the bulb, but also the entire mercury column is exposed to the temperature which is to be measured. However, full immersion is a condition seldom met with when a thermometer is used for technical purposes. In most instances only a portion of the stem can be immersed in the heated medium, and unless the thermometer has been especially constructed for the purpose, grave errors will result."

Discussion

Variations a Serious Matter to the Metallurgist

H. C. LOUDENBECK:[1] The importance of heat treating steel and doing it properly has necessitated a reliable instrument for measuring high temperatures. It is discouraging to the metallurgist to find the pyrometers used in heat treating furnaces from 50 to 100 deg. above or below the correct temperature. This is not an unusual condition at many plants. The installation of pyrometers is intended to do away with all "rule of thumb" and guess work, but has in many cases been the source of trouble and annoyance. There is no more important subject before the metallurgist today, and it is highly important that he secure a reliable instrument for measuring high temperatures. The steel manufacturer is giving less attention to the quality of some common products, such as billets, bar and forging steel, than formerly and is depending more upon the user of these products to properly heat treat them and remedy the open grain, brittle condition given them at the mill by overheating or the result of poor mill practice.

Every metallurgist of today is familiar with the proper method of heat treating steel to bring out its very best qualities. He does this readily in the laboratory where he can control the temperature by a reliable pyrometer properly handled, but what is the result when this practice is introduced into the mill as a regular shop operation? "Ah, there's the rub." Ignorant workmen, someone says. True, to a certain extent, but in the majority of cases, improper treatment in the shop is due to a defective pyrometer. Perhaps a cheap base metal instrument has been installed in the furnace room and left to take care of itself. The automobile manufacturer is familiar with the condition to which I refer and also the steel manufacturer who supplies him with steel; and last, but not least, the owner of a car with a broken axle miles from home. It is a short-sighted policy when a concern does not buy the best grade of pyrometer on the market and after its installation, buy still another to see that the first does not go wrong, for the best is not too good and it should be checked at least once a month by a standard instrument held in reserve for that purpose.

I know a case where a battery of furnaces was equipped with 15 pyrometers having base metal couplers. These instruments were connected by means of a five-point switch to three indicators. Some of these fire rods burned out in less than a week and inside of a month they were all gone. They were all encased in a protection tube of steel. Afterwards protection tubes of porcelain, cast iron, nickel and graphite were tried, with varying degrees of success. The temperature of these furnaces varied from 1400 to 1800 deg. F. The base metal fire rods were finally discarded with the exception of two furnaces. These had a temperature of not over 1425 deg. F. The fire rods were encased in graphite tubes and after three months' service were in good condition.

It has been my experience that for a permanent installation where 1425 deg. F. is not exceeded the base metal couple gives fairly good results, providing it is properly protected in a graphite tube. Where 1425 deg. F. is exceeded a platinum, platinum-rhodium couple should be employed. This should be encased in a royal porcelain tube and the whole enclosed in a graphite tube.

1. What is desired for heat treating purposes is a reliable pyrometer, not necessarily a sensitive one, for the heat in various parts of the furnace will often vary 25 to 50 deg.

2. An instrument that is robust and that will not deteriorate with use.

3. It should be properly protected from the furnace gases and the oxidizing influences of the air.

4. It should be frequently checked by a standard instrument. This should be done systematically and regularly.

Base Metal Instruments Troublesome at High Temperatures

THE AUTHOR: Mr. Loudenbeck has had his share of trouble getting good results with base metal pyrometers. Like many other users he has found that they cannot be relied upon when used at temperatures embracing the heat treatment of steels. I cannot imagine that any of these pyrometers were sold on the strength of their constancy; the principal inducement for the buyer must have been their low price. A salesman must have talking points, and he will add in an offhand manner that if played out his pyrometers can be replaced for a few dollars. Let us say the fire rods for his 15 furnaces cost $5 each, and to be modest, according to his own statement, let us assume they had to be replaced once in two weeks. Their maintenance per year would then have amounted to $1,800, not counting incidentals, annoyance, interruptions in service, etc. For very little more than one-half this amount he could have had the best equipment that is obtainable; and, at such temperatures, which are considered low when platinum, platinum-rhodium thermo-couples are used, the yearly repairs should surely amount to less than $50, including breakage by accidents.

Mr. Loudenbeck emphasizes protection tubes as of great

[1]Chief chemist Westinghouse Air Brake Company, Wilmerding, Pa.

importance. I fully agree with him, though my choice would not always be royal Berlin porcelain or graphite tubes. They should be selected to suit conditions. For instance, royal Berlin porcelain tubes are mostly coated with a silica glaze, which at high temperatures will withstand an oxidizing atmosphere, but will de-vitrify in a reducing atmosphere. Again, graphite is affected in the opposite manner. I would not recommend the use of graphite as a protection for base metal pyrometers; as these usually consist in part of iron or an iron alloy, and it must be expected that above red heat part of the carbon will be absorbed by the metal, which naturally contributes to change the electromotive force of the thermo-couple.

Temperature Variations and Silicon in Pig Iron

PROF. C. P. LINVILLE[3]: A phase of the subject, which to me is of great interest, concerns the use of pyrometers for measuring and recording the hot blast and downcomer gas temperatures at blast furnaces. I have done quite a little experimental work in connection with the determination of the effects of combustion temperatures on blast furnace operation. As an illustration of the necessity of having accurate pyrometers, and to show the effects of small temperature variations I will cite a test where I studied the records of a blast furnace, running on pig analyzing from 1.5 to 3 per cent. silicon. Three things in particular were studied: the effects of variation in the hot blast temperature, the effects of variations in the moisture content of the blast, and the variations in the silicon content of the pig iron made, the records covering about 40 days' operation. Without going into details I found that with this particular furnace, working under their conditions, a change of 17½ deg. F. in the theoretical temperature before the tuyeres would give a change of 0.10 per cent. silicon to the pig iron. This variation of 17½ deg. might be caused by a change of 22 deg. F. in the hot blast temperature or of 0.7 gr. of moisture per cu. ft. in the air blast used.

If a difference of 22 deg. F. in the hot blast temperature will cause a variation of 0.10 per cent. silicon in the pig iron, the importance of accurate hot blast temperature control becomes at once apparent. There are probably few places where pyrometers are more universally used than in connection with blast furnaces, but from observations I have made I am led to believe that there is great need for instruments and methods of installation which will give true readings. Take the question of "cold end temperatures." Little attention is paid to this at blast furnace plants, it being assumed that "cold end temperatures" are approximately constant; yet I know of an instance where a variation of 150 deg. F. in "cold end temperatures" might be possible. My appeal to blast furnace managers would be that, if thermo-couple pyrometers are to be used, by all means provide some means by which the "cold ends" can be kept at a constant temperature, and then have the couples and recording instruments standardized for this "cold end" temperature.

Since the principal object of taking hot blast temperatures is to obtain the temperature of the air as it enters the furnace, it is best to have the thermo-couple, or other pyrometers, placed as near the furnace as possible. With thermo-couples which must of necessity have rather short leads, it will be necessary to provide some such thermostat as Mr. Stupakoff uses in connection with the galvanizing pots which he described, or by using exhaust steam, or by other means, to maintain this necessary constant "cold end" temperature.

A much better method, it seems to me, would be to employ an electrical resistance pyrometer. Such a pyrometer is not affected by "cold end" temperatures, gives much more accurate readings than a thermo-couple, and with the recording instruments now available is not nearly so apt to get out of order, since the mechanism for taking and recording the temperatures is actuated by an entirely independent current. I do not believe that any of this type of instruments are in use in this country for blast furnace temperature measurements, but believe that before long they will be recognized as being very much superior to any of the thermo-couple types.

The Thermos Bottle in Low Temperature Work

C. E. SKINNER:[3] One point I might mention is the use of the thermos bottle in low temperature work for keeping the cold junction at a constant temperature. We are at the present time making use of the thermo-couple for low temperature measurements, using a potentiometer for taking readings, and this is giving most excellent results. We can take measurements accurately which would be impossible with the thermometer, and a single observer can take temperatures at 50 points and plot the curves with greater ease and accuracy than would be possible by the use of thermometers. One of the interesting applications we are making of this type of measuring device is in connection with the flow of heat through heat insulating materials. For this work we use base metal couples, usually copper-constantan.

In our process we are required to measure temperatures from very low to very high, and in all of the intermediate ranges, and during the last 15 years we have had experience with nearly every known make of pyrometer; like many others present, we have found difficulties with every type we have attempted to use. The thermo-couple with measurement taken by the potentiometer gives the most satisfactory results of any which we have tried to date, but we still have more or less difficulty in the use of these thermo-couples, due to the points already indicated by Mr. Stupakoff.

Mention was made of the sensitiveness of babbitt metals to heat treatment. I can confirm these statements from our experience. We have recently placed in service a testing device for determining whether or not our babbitt metals have been properly heat treated in their manufacture and in their application. This is in effect a small trip hammer striking a light blow on a proper sample, and the effect of the repeated blows gives in a very striking manner the necessary information as to whether the babbitt has been overheated or has been poured at too low a temperature. When once badly overheated, unlike steel, it cannot be readily brought back to a proper physical condition. The problem of annealing sheet steel has required a good deal of attention, and we have spent a good deal of money on pyrometers for this purpose; we are still looking for a thoroughly satisfactory outfit for use in our annealing furnaces.

THE AUTHOR: I believe the use of the thermos bottle in connection with thermo-couples originated in my laboratory, and that the details of its application are little known. Calling the apparatus simply a "thermos bottle" is not doing it justice. It would be more appropriate to name it "cold junction temperature regulator." A thermos bottle, or preferably a thermos jar, is an excellent and simple means to preserve the uniformity of temperatures of the cold junctions of thermo-couples. This jar or bottle is best filled with ice, though it may contain water or other suitable substances which have been previously cooled or heated to a desired temperature. When used in the laboratory it is preferable to solder the free ends of the thermo-couple to the connecting wires leading to the galvanometer, recorder or potentiometer. The individual wires are carefully separated from each other, so that only their junctions form a point of contact. They are introduced in this manner into U tubes, or in tubes closed at one end like test tubes, which are pushed through piercings in the cork closing the neck of the bottle, and which enter the ice, or other constant temperature medium, for about three inches. An accurately graduated precision thermometer made for a three-inch immersion is also pushed to the right depth through the cork, and the apparatus is ready for use.

Steel Works Practice

A. F. T. WOLFF[4]: There is one thing that Mr. Stupakoff forgot to mention and that is the troubles usually found with the average practical man in the works. We have found in quite a number of instances that we can send out an expert used to handling the instruments and he will bring us results. But if we place the same instrument out in the mill and let the average workman use it, he can not bring us many good results. Sometimes it is due to the instrument, cold junction too hot or some other of the numerous troubles, and in other cases it is the fault of the man. It is only after careful training that the average workman can use the present instruments with any chance of good results.

[3]Professor of metallurgy, Pennsylvania State College, State College, Pa.

[3]Engineer of research division, Westinghouse Electric & Mfg. Company, East Pittsburgh.

[4]Chief engineer Edgar Thomson Works, Carnegie Steel Company, Braddock, Pa.

For years the steel makers have used instruments based on the calorimetric principle, like the Siemens pyrometer, with a ball that is placed in the furnace, then quenched in water and the temperature of the furnace or mass under treatment determined from the water temperature. This is about the best instrument for this class of work at present, as it has no mechanical complications. But it depends on the absolute measurements of water. Seven hundredths of an inch makes a difference of 25 deg., if it is measured in an ordinary tin pint measure. Glass flasks are easily broken and may come to quite a sum in the course of a year. The balls must be properly placed and also changed very often, as they lose weight. All in all the instrument requires special attention on the part of the operator to secure good results.

Optical instruments depend to a large extent on the man that uses them and are inaccurate when used where flame or gases abound. Metallic expansion pyrometers do not remain accurate for any length of time. Pneumatic pyrometers are a source of unending troubles in the works due to the extremely large influence of small leaks and dust. Radiation pyrometers are influenced by the temperature of the telescope and the distance from the body, although with filled field they are theoretically independent of distance.

We have found that recording instruments are too delicate. They must be placed on heavy stone or brick columns and foundations and even then are jarred and do not give satisfactory results. The recording device in itself is unsatisfactory and a source of trouble or extra precautions and work. We have tried instruments with base metal couples, with rare metal couples, pneumatic pyrometers and practically instruments of all kinds, and have found that the mechanical parts, like galvanometers, etc., are entirely too weak and delicate, besides having the usual cold junction, bad contact and resistance troubles, spoilt and broken wells and others of the varied pyrometer annoyances.

If our present day watches were like our pyrometers, we would miss many trains and would probably throw them into the scrap heap. The scientist and instrument maker should give us an instrument which we can place in the hands of the average workman, which will be robust and accurate within 5 or 10 deg., without having to correct for cold junction variations or make any other corrections, which requires no special training in its use and which will be fool proof.

Mill Pyrometers and Untrained Workmen

THE AUTHOR: Mr. Wolff says that pyrometers should indicate the heat conditions of materials from 5 to 10 deg., meaning with an accuracy of about ½ to ¼ of 1 per cent., and that reliable heat measurement of moving bodies should be made within a few seconds. This places us between two fires. The problems to be solved call for the use of a precision instrument, and the work itself must be done in the mill. * * * Let us take as an example the specific requirements in a rail rolling mill. The temperature of the head and the foot of the rail is to be taken directly after it has left the last pass. The time limit is set at ten seconds. It is, of course, necessary that within this short space of time the pyrometer must be applied to the rail itself, that it must be given an opportunity to assume an identical temperature, that the effect must be transmitted to a suitable indicating instrument, and that finally the readings of this instrument must be taken by the deflection of a pointer over a temperature scale. All this must be done quicker than it takes me to tell you. It could not be expected that such feats could ever be accomplished with a coarse mill instrument. We have worked at the solution of this problem for nearly 10 years, and only after abandoning the crow-bar idea have we succeeded in completing within a few days an instrument which will furnish the information wanted within less than five seconds. Mr. Wolff will have the first opportunity to apply it in practice, provided he assumes all risks after the instrument is turned over into the hands of his "average" workman.

Many Furnaces and Centralized Pyrometers

I desire to mention a pyrometer installation made a few years ago in Canton, Ohio, which has since been duplicated in factories located in Toledo, Detroit and other places. In these plants workmen have nothing whatever to do with the pyrometer proper. In the first mentioned place are 58 furnaces, all equipped with Le Chatelier pyrometers which are centralized at a single station where the observations are made and where the temperatures are checked. All furnaces are equipped with a series of electric lights; red, white and green. When the temperatures check correctly the white lights are burning. When a furnace begins to get too hot the operator switches on the red light, and the combination of red and white informs the furnace man that this oven is getting too hot. If it exceeds the upper set limit the white light is turned off, and the red alone remains burning, meaning that work must be stopped, and that the temperature of the furnace must be brought down to working conditions. The system is manipulated in exactly the same manner when the temperature of the furnace drops below normal, by operating the green and the white, or the green light only. The introduction of this system has made it possible to have all the heat treatments of the materials made by common laborers who turn out a far better product at the present time than could be obtained formerly with skilled mechanics.

The furnaces referred to comprise a number of case-hardening and different kinds of hardening and tempering furnaces, besides a series of six automatic rotating hardening furnaces. All are worked in the manner as I have just described. No one gets near the pyrometer galvanometer but the man who is detailed for the job. There are a few recording instruments in the main laboratory, and any one of these can be switched on to any one of the 58 furnaces without the knowledge of the operator, so that any one may expect that his doings are being watched at any time during the day or night. The autographic records also will expose them if they did not attend to their work as instructed.

The same system is being used with excellent results in another plant where automobile and wagon springs are manufactured. Formerly no other men but experts could be employed for this class of work; now they pick up any kind of an intelligent laboring man, and they are better served and turn out more uniform springs than ever before. The pyrometer system has been divided in this particular instance into two distinct groups, one comprising rare metal pyrometers, which are used in the hardening furnaces, and the second consisting of base metal pyrometers which are for the control of temperature in the tempering furnaces. Each group is connected by the introduction of a suitable switchboard connected to an independent indicating galvanometer.

Electrical Resistance Pyrometers in Europe

S. A. GRAYSON:[5] I would like to ask if there is any reason why the electrical resistance pyrometer has not met with such favor in this country as it is receiving in Europe, particularly in England, where it is being used considerably for hot blast work and conditions such as the galvanizing tank, where the hot junction temperatures have to be contended with to a very serious extent. It is also being used for varying temperatures up to as high as 1000 deg. C. with reasonable accuracy and particularly for general steel-hardening work. Of course there is no doubt that the Le Chatelier thermo-couple of platinum and platinum and 10 per cent. rhodium, using the potentiometer method is by far the most efficient for determining the critical changes in steel or other metals, which take place and are shown in the heating and cooling curves. Particular evidence of this is given with metals or alloys, the critical points of which are unusually sensitive and it is difficult to secure constant readings. On the question of radiation or optical pyrometers, my experience has brought me into contact with different types of these, including the Wanner and Siemens; but the Fery radiation, based upon Stefan's law, seems to have undoubtedly proven the most adaptable in the application to heat treatment of iron and steel. The difficulty that attends the use of the optical pyrometer is the inconstancy of the standard light, in most cases an electrical lamp attached to a battery, the intensity of which naturally decreases and therefore the heat readings of objects as compared with this lamp, apart from the personal element of the operator, are subject to error caused by such fluctuation. Of course, the brightness of the electrical lamp can be standardized, as in the case of the Wanner instrument, with an amyl-acetate flame; but in order to obtain constant and accurate readings a system of periodical standardization of the light produced by the battery, with a standard flame, must be rigidly adhered to.

[5]General manager Jessop Steel Company, Washington, Pa.

THE AUTHOR: In a general way far greater attention is paid in Europe to heat measurements and heat treatment of materials than in America. There are three reasons for this. The first is that nearly all new types of pyrometers originated abroad; second, that all new methods and apparatus are carefully investigated by their scientists, and third, that scientific bodies always co-operate with the manufacturer. We may add that scientific research work is more liberally supported and encouraged by foreign governments than by our own. I assume that Mr. Grayson's reference to the various uses of electric resistance pyrometers for the measurement of high temperatures—he mentions 1000 deg. C.—dates back to his observations made not less than two or three years ago. As I have said before, we have learned within the last few years, and we were compelled to lower the rank of resistance pyrometers.

My views as to the most efficient means for determining the critical points in steel and for producing cooling curves of metals and alloys differ somewhat from those expressed by Mr. Grayson. It is true that fairly good curves can be obtained by following the thermo-electric recording galvanometer method, which is beyond doubt the easiest one of all. A far better one, though considerably more difficult, is the potentiometer method. The resistance thermometer method seems to me lies half way between. The application of a resistance pyrometer to test pieces is less convenient and the test pieces themselves must be carefully prepared, which makes them more expensive than those which would answer for applying a thermo-couple; but I must say that unquestionably I have obtained occasionally far superior curves by these means than with the aid of thermo-electric couples and a galvanometer recorder.

PROF. C. P. LINVILLE: I think that one of the reasons why the resistance pyrometer has not been used more in this country has been the lack of suitable indicating and recording instruments for use in connection with them. All resistance pyrometers are dependent on some variation of the bridge method for determining the resistances, and each reading required some manipulation of the apparatus before the temperature could be determined. No one will deny, however, that the result when obtained was of the highest accuracy. Even the Callendar recorder has not proved satisfactory, and is too delicate for works use. I hold no brief for any manufacturer, but believe that I am within my rights in saying that the Leeds & Northrup Company has perfected a recording instrument, which reads and records the temperatures of resistance pyrometers with a most excellent degree of accuracy. At the same time the instrument is rugged, and well suited to works use.

Resistance Thermometers and Optical Pyrometers

HERMAN HOLZ:[6] A special type of electric resistance thermometers has been developed recently which is made in such a way that the resistance consists of an absolute chemically pure platinum wire coiled in a spiral on a small rod of quartz glass. This rod and the platinum coil are then introduced into a thin tube of quartz which is intimately fused onto the rod, so that the resistance wire lies very close to the surface; thus the resistance wire is completely protected from the injurious effects of gases, vapors, etc., and the well known properties of the quartz render the entire instrument capable of standing the most sudden changes of temperature. This type of resistance pyrometer is made for measuring temperatures from —200 to + 900 deg. C., and very fine recording devices have been constructed in connection with these instruments. Mr. Stupakoff mentioned his experience in optical pyrometry of some years ago, but it is regretted that he did not mention the improvements and the many applications which optical pyrometers have found since that time, as these instruments for quite a number of purposes are the only ones which can be used at all. For measuring the temperatures in glass furnaces, cement works, gas retorts and porcelain factories, optical pyrometers are preferable to any other type of high temperature measuring instruments. I believe that the recent improvements in the construction of optical pyrometers with direct reading temperature scales and steel cases, which completely protect the instruments against heat and dust, are the most perfect types of pyrometers which can at present be obtained for the correct measurement of temperatures from 625 to 7000 deg. C. The U. S. Bureau of Standards and the Reichsanstalt have recognized this fact long ago, and have given due acknowledgment to the importance of optical pyrometry in a number of highly interesting circulars. An instrument designed on the basis of an infallible physical law must always be preferable to devices constructed on "ascertained properties" of certain materials, such as the thermo-electric forces expressed by galvanometers connected to thermo-couples, resistance pyrometers, and radiation pyrometers.

THE AUTHOR: Mr. Holz states that the best resistance thermometers are made for measuring temperatures up to 900 deg. C., but it is evidently unknown to him that the manufacturer refuses to guarantee and furnish these thermometers for industrial purposes for higher temperatures than 700 deg. C.

GEORGE SCHINDLER:[7] It may interest you to hear of the latest improvement in pyrometry, which originated in our laboratories. It is an automatic regulating device, especially designed for use in connection with galvanizing pyrometers, for keeping the points of cold junctions of base metal thermo-couples at practically a uniform temperature. We have succeeded in adjusting the apparatus to operate reliable within ½ of 1 deg. F., though in practice it will prove nearly always sufficient to get within 4 or 5 deg. The actual error thus remaining in the indicating or recording instrument will then be less than 2 deg., an amount which is barely perceptible with the aid of a magnifying glass. I have just returned from the galvanizing plant of the National Tube Company at Versailles, where we have installed such an apparatus. It went off without a hitch.

Experience in the Wire Industry

W. E. SNYDER:[8] We started the practical use of electrical pyrometers 10 or 12 years ago. The first Le Chatelier pyrometer which we used was purchased in New York. I think the cost of one thermo-couple and the porcelain tube which incloses it was $60. The first time this couple was used was to measure the temperature in the upper part of a gas producer, which was done by introducing the couple encased in the porcelain tube through a poke hole, all in accordance with the instructions of the sellers of the instrument. The gas escaping from the poke hole suddenly ignited, causing the workmen holding the tube in place to make a quick jump, which broke the porcelain tube, and the unprotected couple was almost immediately destroyed by the effect of the producer gas.

There is no doubt in my mind that the problem of making a high grade pyrometer which will be both accurate and durable is now much nearer solution than it has ever been before, and I believe thoroughly in what Mr. Stupakoff has said in his discussion. There is a field for the engineering specialist in the development and installation of high-grade temperature measuring instruments. The unloading on manufacturers of all kinds of so-called high-grade pyrometers which have never been developed sufficiently to warrant their being sold throughout the country only causes trouble and expense to the manufacturers, and certainly cannot contribute to the continued success of the makers. I think the fault has been in the effort to sell cakes which were not even half baked. Instruments which were reliable and accurate were of such a type that they could not be used long in practical work without getting out of adjustment; handled by experienced, technical men for test purposes, they were satisfactory, but the attempt to use them regularly in manufacturing processes was not satisfactory. In addition to this they were too expensive.

It is to be hoped that the use of the best base metal couple now made and also the best high resistance galvanometer will completely eliminate the troubles which have been mentioned. What is required is reliability and durability. When these characteristics are features of the instrument, the only question is proper installation and use of the same, which the manufacturer will work out for himself. However, the manufacturer must look to the instrument maker to produce for him an instrument, not for laboratory use by a technical man, but for installation and use in a manufacturing process. The first cost is a comparatively small matter provided the instrument is thoroughly reliable and durable.

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Manufacturers Not So Greedy As Claimed

Although often controverted by indubitable proof, the impression is widespread among non-manufacturers that prices of manufactured products in this country have a direct and close relationship to foreign prices plus the duty. There have been times when business conditions in this country as compared with those abroad may have afforded some basis for such a belief. Any assertion to that effect lacks its force this year, although the opponents of protective duties are endeavoring to make an issue on the tariff question in the pending Presidential campaign. For quite a considerable period conditions in the iron and steel trade have been the reverse of those usually found. Prices of iron and steel in this country are lower, and on some articles are considerably lower, than the prices prevailing in Europe.

Practical illustrations of the difference between iron and steel prices in this country and abroad are cropping out. In this way it is likely that quite a number of people are becoming educated on the general question of the bearing of tariff duties on home prices. For instance, Western consumers of structural material, who have become somewhat exercised over the advancing prices named by American manufacturers, find they can get small comfort from turning to possible foreign sources of supply. They learn that beams and other standard shapes of structural material are selling at higher prices at foreign shipping ports than even the latest advanced prices named for such material f.o.b. Pittsburgh. A recent inquiry, which took in foreign prices at port of shipment, ocean freight rates, import duty and railroad freight rates from the seaboard to the West, showed that domestic structural material is now being laid down in the Missouri Valley at about 1.67 cents per pound, while foreign material would cost about 3.3 cents per pound, delivered there. The duty on this class of product forms but a small portion of the total cost of such material, if imported. The duty is three-tenths of one cent per pound on structural shapes valued at nine-tenths of one cent per pound or less and is four-tenths of one cent per pound on shapes valued above nine-tenths of one cent per pound.

A comparison of these prices shows that domestic manufacturers, to whom the tariff reformers impute the disposition to take full advantage of opportunities afforded by tariff duties, are at present singularly blind to the great chance now presented to them for making extravagant profits. It shows that domestic prices could be considerably raised above those now ruling without any risk whatever of losing business to makers of structural material across the Atlantic. The truth is that competition for business among domestic manufacturers keeps them so busy watching one another's prices that they only take an academic interest in foreign prices.

It is of course conceded that iron and steel prices in this country are usually higher than those prevailing in Germany and Great Britain, this fact being largely due to the higher cost in this country resulting from the higher rate of wages paid to workmen. The decline of prosperity in Europe or a very great increase in the capacity of European iron and steel works is sure in time to bring about the old conditions of prices higher here than abroad. When that time comes a duty on iron and steel may prove to be of some value

to American iron and steel makers. It will then prevent this country from becoming a dumping ground for the surplus product of European makers.

Steel Exports and the Trade Balance

It will probably surprise many of our readers to learn that the favorable trade balance in iron and steel in the three months April, May and June exceeded the total trade balance in all merchandise by 68 per cent. The favorable balance in our foreign trade in all merchandise was $43,375,600, while our favorable balance in iron and steel alone was $72,803,361. If there had been no iron and steel trade, the country would have had an unfavorable trade balance in the three months of $29,427,761.

The showing is the more remarkable when it is considered that iron and steel commodities by no means preponderate in our export trade. In the three months they comprised only 16 per cent. of the total merchandise exports, yet they turned what would have been a disastrously unfavorable balance into a moderately favorable one, though not one which, if continued throughout the year, would have saved the country from serious readjustments.

The figures for the three months are given in the table below. To the exports of domestic iron and steel are added the exports of foreign iron and steel ($19,268 in April, $60,806 in May and $88,470 in June) which inclusion is proper in the circumstances, because in computing the general merchandise trade balance exports of foreign merchandise are always included:

The Merchandise Movement.

	Exports.	Imports.	Balance.
April	$179,289,342	$162,724,172	$16,565,170
May	175,408,058	155,710,573	19,697,485
June	138,233,742	131,120,797	7,112,945
Total	$492,931,142	$449,555,542	$43,375,600

The Iron and Steel Movement.

	Exports.	Imports.	Balance.
April	$26,809,121	$2,058,945	$24,750,176
May	28,111,053	2,487,446	25,623,607
June	24,884,272	2,454,694	22,429,578
Total	$79,804,446	$7,001,085	$72,803,361

In two respects the showing of the three months is not conclusive as to the general trend of our foreign trade. In the first place, the iron and steel exports in the three months were exceptionally high. The $79,804,446 of exports in the three months compared with $187,845,423 in the preceding nine months of the fiscal year, that being an average of $62,615,141 per quarter, so that there was an increase of 28 per cent. However, the larger exports appear to have come to stay. In the past three years the movement has increased its pace several times, and in each case the improvement has been held.

In the second place, the figures of the total merchandise movement in the three months April to June are not indicative of the average movement in a twelvemonth. The high point in our favorable trade balance is usually in December, the low point falling in the summer. To permit a precise statement as to this point, we have scrutinized the monthly trade balance for the past ten years, scoring two points to the record month of the year and one point to the next best month, whereby it develops that October secures eight points, November five, December twelve, January four, and February one point. The enlargement of our trade balance, culminating in December, is, of course, due to the cereal movement.

Thus the analysis of our trade balance for the three months April to June, comparing the balance in iron and steel and the balance in all other commodities, is not conclusive as to the movement throughout the year. It is not possible, however, to reach the precise facts by taking the record for the twelve months ending with June, for the reason that during the whole period the iron and steel exports were not nearly as large as in April, May and June, or as large as there is reason to expect them to be in the future. Inasmuch, however, as there is no reason to infer that there will be a seasonable variation in our iron and steel balance of trade, it seems perfectly fair to take the actual showing for the fiscal year and then compute what the showing would have been had the large iron and steel movement in April, May and June been continued throughout the twelvemonth. The actual figures for the fiscal year are as follows:

	All commodities.	Iron and steel.	All commodities except iron and steel.
Exports	$2,204,322,409	$268,658,655	$1,935,663,754
Imports	1,653,354,934	26,551,040	1,626,803,894
Balance	$550,967,475	$242,107,615	$308,859,860

The fiscal year's favorable balance in iron and steel alone was $242,107,615, which was 44 per cent. of the total favorable balance in all merchandise, although comparing the total movements, imports plus exports, the iron and steel movement was less than 8 per cent. of the total movement. The showing, as just suggested, is not nearly as strong as it would have been had the large iron and steel exports of April, May and June been a feature of the entire fiscal year. It is easy to compute what the results would have been had this been the case, and such a computation is not unreasonable. It furnishes a forecast of what will occur in the fiscal year just commenced, provided the iron and steel movement continues as it was in April, May and June, and provided further the movement in other commodities experiences no change from the fiscal year just ended.

The favorable balance in iron and steel in April, May and June was $72,803,361, which is at the rate of $291,000,000 a year. The balance in the past fiscal year, in commodities other than iron and steel, was $308,859,860, and assuming this to continue for the present fiscal year, with $291,000,000 favorable balance in iron and steel, makes a total favorable balance of $600,000,000, of which iron and steel would be contributing 48.5 per cent., while upon the same hypothesis the total iron and steel movement, imports plus exports, would be only 8.9 per cent. of the total movement in commodities. Iron and steel would thus be contributing between five and six times as much as its share on a pro rata division.

Flanged Fittings Over-Standardized

Flanged fittings and flanges for pipe lines are for the present at least in what may be called an over-standardized condition. Articles in recent issues of *The Iron Age*, including one elsewhere in this issue, have indicated that two standards are struggling for recognition, one promulgated some time ago by the engineer and the other very lately by the manufacturer. What will really settle the question will be the ultimate demands of the user. If the engineer or the contracting pipe fitter insists on the so-called 1912 U. S. standard, which is that adopted by a committee of the American Society of Mechanical Engineers, it

seems certain that some one manufacturer at least will supply what is wanted. In any case the buyer will pay the cost. That fact rather nullifies the argument of the manufacturer that the 1912 U. S. standard is likely to occasion undue expense, due to changes of patterns and other causes.

What must not be lost sight of in the whole controversy is that after all not more than 10 per cent. of the buyers of flanges and fittings for pipe lines will be required to look into the merits of the standards. The 1912 U. S. standard provides for changes practically only in large-sized pipes and in piping subjected to high pressure and for transporting superheated steam; and such pipe systems are to be found mainly in the large steam power houses of the country. As a matter of fact a considerable percentage of these same power stations are buying their fittings to their own specifications and in a measure are paying the price of a special article. From an outside viewpoint, therefore, it is difficult to see why there should be the lack of agreement.

One point advanced by the manufacturing side is that in some of the fittings designed in accordance with the engineer's standard the lines of the product depart somewhat from those calculated to give the fitting the best appearance. When it is considered how much attention is given to looks in the modern power house this objection is really not frivolous. The care taken in the installation of machinery, piping, conduits for electric wires and the design of even the floors and interior walls of the power house have for some time been the subject of admiration, and undoubtedly there has developed a sense of artistic proportions which would be disturbed by piping work of awkward and unattractive contour. Yet it is a question if even a considerable departure could not be made in the lines of a single fitting, wrapped in pipe covering as it is, without offending the educated eye of the plant visitor.

The article elsewhere presents the argument of the manufacturer and also indicates something of the reasons why the engineer has felt called on to establish his standard. He desires a size of fittings which may readily be replaced by some other similar fitting without forcing him to take the substitute fitting from some particular manufacturer or without dismantling the pipe line, an obviously serious objection in the large power house where continuity of service is a prime requisite. He has also felt that in a number of cases provision must be made for large diameters of bolts. Neither side appears willing to yield, and, as stated, the resultant standard will undoubtedly be that for which there is the greater demand.

Compulsory Working in the New Patent Bill

The bill reported at Washington by the House Committee on Patents, the purpose of which is to break up the so-called "patent monopoly," has for one of its remedies a provision granting compulsory licenses under unworked patents. While the bill is directed against the great corporations, this particular section would be detrimental to few of our manufacturing interests, and would be beneficial to many, as well as to the public. The monopoly which a foreign inventor is insured by the United States patent law, permitting him to work his invention at home and maintain it in idleness here, excluding the American from its use, is one in which little good reason exists, especially in the face of the fact that leading foreign nations compel the American inventor to work the patents they have granted him if he is to receive protection. Failure to comply with this provision within a given time means that either the patent automatically becomes void or that the invention becomes legally usable by others under a license. The latter recourse has been chosen by the House Committee on Patents. While no action is expected at the present session of Congress, the causes which have led to the framing of the bill are sufficiently important to demand action in the immediate future.

The bill would empower the United States District Court of the jurisdiction wherein the owner of the patent or of any interest in the patent has a residence or established place of business, to compel the granting of a license under the patent. Upon the filing of a bill in equity by the applicant, and a hearing of the parties interested, the court would decide whether the invention is being withheld or suppressed for the purpose of, or with the result of, preventing any other person from using the patented process, or making, using or selling the patented articles in the United States in competition with any other article or process, patented or unpatented, used in preceding years. If the decision should favor the applicant for a license, the court would define the terms of royalty, etc., under the license which it would order issued.

Under the American patent system, however, this remedy would not be wholly adequate. Too many means are given the owner of an invention to prolong his protection in the Patent Office. Dilatory tactics may be employed, and, in fact, are employed constantly. The present law makes it possible for the inventor, or the person or corporation to whom he has assigned his rights, to defer the actual taking out of his patent, by means too well understood to need description, so that the life of the patent is actually extended far beyond the prescribed 17 years. This practice has been reduced to an exact science. In order that new legislation may be effective against the burying of patents, by the foreigner or by the American inventor or his assignee who finds it worth while to keep the results from the public, there must be added to compulsory working a provision against this form of manipulation. To meet it is deemed by patent experts to be wholly feasible. Some years ago a radical change was made in the law in this respect, but it did not go far enough. Practice has revealed the remaining weak points.

Gompers Would Impeach His Judge

A Washington dispatch says: "Samuel Gompers, president of the American Federation of Labor, appeared before the Democratic Congressmen from Nebraska to offer evidence which he believes will result in the impeachment of Judge Daniel Thew Wright, of the Supreme Court of the District of Columbia. Pursuant to the platform of the Democratic party in Nebraska, its delegation in Congress is requested to investigate the action of Judge Wright in holding Gompers, Mitchell and Morrison in contempt of court for violating an injunction. The session was executive and the details of Gompers' testimony were not made public." As Mr. Gompers seems to get everything he wants from all parties at Washington except the courts, it is up to him to have the irreverent judge impeached and removed, after which he will be untrammeled in bringing about the rule of organized labor instead of the constitution of the United States.

The Steel Corporation's Orders Increased

The unfilled orders on the books of the United States Steel Corporation subsidiaries on July 31, as reported August 10, were 5,957,079 tons, an increase over the amount reported for June 30 of 149,733 tons. The total on July 31 is greater by 2,372,994 tons than for the corresponding date in 1911. It is 30,000 tons greater than that of December 31, 1909, which was noteworthy at that time, the buying movement of the last few months of 1909 being then at its hight. Between January 1 and April 1, 1910, this total fell to 5,402,514 tons. The statements beginning with January, 1911, when the first monthly figures were given out, are as follows:

July 31, 1912	5,957,079	September 30, 1911	3,611,317
June 30, 1912	5,807,346	August 31, 1911	3,695,985
May 31, 1912	5,750,983	July 31, 1911	3,584,085
April 30, 1912	5,664,885	June 30, 1911	3,361,058
March 31, 1912	5,304,841	May 31, 1911	3,113,187
February 29, 1912	5,454,200	April 30, 1911	3,218,704
January 31, 1912	5,379,721	March 31, 1911	3,447,301
December 31, 1911	5,084,761	February 28, 1911	3,400,543
November 30, 1911	4,141,955	January 31, 1911	3,110,919
October 31, 1911	3,694,328		

The totals at the close of the various years have been as follows: 1902, 5,347,523 tons; 1903, 3,215,123 tons; 1904, 4,696,203 tons; 1905, 7,605,086 tons; 1906, 8,498,719 tons (the high record); 1907, 4,624,552 tons; 1908, 3,603,527 tons; 1909, 5,927,031 tons; 1910, 2,674,757 tons; 1911, 5,084,761 tons.

Large Scherzer Rolling Lift Bridge for England

One of the principal bridge building contracts of the year has just been placed by the Great Central Railway of England with Sir William Arrol & Co., Ltd., Glasgow, Scotland. It is for the construction of a railroad and highway Scherzer rolling lift bridge and approaches across the Trent River at Keadby, in Lincoln, England. The structure will be composed of two fixed approach spans in addition to the bascule span and the track girder span upon which the moving leaf rolls in its operation. The total length of steel work will be nearly 500 ft. The railroad section will have a width of 29 ft. and the highway 24 ft. The movable span of this bridge is of the Scherzer single-leaf through type, and as it will have a movable length of 160 ft. and an extreme width of nearly 60 ft. it will be one of the largest bascule bridges in the world. The power will be electricity generated in a machinery house alongside the bridge. The Scherzer Rolling Lift Bridge Company, Chicago, of which Albert H. Scherzer is president and chief engineer, designed the superstructure, operating machinery and power equipment of the bascule span, and will maintain a general consulting engineering supervision over it.

Record Shipments of Lake Iron Ore

A new record in Lake Superior iron ore shipments was made in July, when the total was 7,600,233 gross tons, against 5,221,373 tons in July, 1911. To August 1 the total this year was 21,290,904 tons, which is also a record at that point in the season. The shipments by ports last month and to August 1, with corresponding figures for 1911, are given below in gross tons:

Port.	July, 1911.	July, 1912.	To Aug. 1, 1911.	To Aug. 1, 1912.
Escanaba	644,098	836,346	1,711,806	2,478,294
Marquette	309,438	511,924	843,177	1,430,814
Ashland	439,843	771,057	1,102,263	2,103,858
Superior	1,747,364	2,324,324	4,698,855	6,668,655
Duluth	1,108,316	1,540,324	3,158,450	4,385,802
Two Harbors	972,314	1,616,258	2,549,740	4,223,481
Total	5,221,373	7,600,233	14,064,291	21,290,904

The Thomas Iron Company, Easton, Pa., has passed its usual dividend. This is due to the fact that the dividend was not earned, as so many of the company's furnaces were idle, and the directors decided that it would be advisable under present conditions to conserve the surplus. This is not the first time in the history of the company that a dividend has been passed, but on several occasions the same course was pursued when earnings did not justify a distribution.

The Dominion Government has ordered 5000 tons of steel rails for the Intercolonial Railroad from the Dominion Iron & Steel Company.

July Copper Production and Stock

The Copper Producers' Association has issued its monthly statement for July, which makes the following showing compared with June:

	July. Pounds.	June. Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States at first of month	44,335,004	49,615,643
Production of marketable copper in the United States from all domestic and foreign sources during the month	137,161,129	122,315,240
Deliveries of marketable copper during the month:		
For domestic consumption	71,094,381	66,146,229
For export	60,121,331	61,449,650
Total deliveries	131,215,712	127,595,879
Stock of marketable copper of all kinds on hand at all points in the United States at close of month	50,280,421	44,335,004

Notwithstanding the increase of production, which was 11,226,056 lb., shipments kept up so well that the increase in stock on hand was only 5,945,417 lb. This, however, is something of a departure from the experience of the past twelve months, almost every month having shown a decline in the stock.

The production in July was the largest recorded for any month, but it is explained that the output of June was exceptionally low, owing to strikes at the American Smelting & Refining Company's Perth Amboy and Baltimore plants. A copper authority is quoted as follows: "Perhaps the fairest way to arrive at the situation would be to average the two months, giving a combined increase of 10,400,000 lb., or 5,200,000 lb. each month. The net change in total deliveries for two months was a decrease of 10,972,000 lb., and stock on hand August 1 was only 665,000 lb. more than on June 1."

Max H. C. Brombacher's European Investigation

Max H. C. Brombacher, practical efficiency engineer, New York City, who left here last January on a tour of investigation of the railroad shops of England and the Continent of Europe, with especial reference to shop management, equipment and cost of its maintenance, has just returned. He is at work on his report to the Interstate Commerce Commission, but, owing to the vast amount of statistical data requiring collation and tabulation which he has collected, covering cost of standard operations and other items relevant to the subject of economical management of shops and equipment, he will hardly get his report in much before the end of the year.

He reports that the shops and depots which he visited, and they comprised the principal shops and depots of the railroads of England, France, Switzerland, grand duchies of Baden and Hesse-Darmstadt, kingdoms of Bavaria, Prussia, Saxony and Würtemberg, and of the Austrian Empire, permitted him every possible opportunity to observe their equipment and methods of working; and that out of compliment to this nation one and all the officials of these different countries, beginning with the ministerial heads and getting down to the directors of the shops, extended to him every possible courtesy and treated him in the most cordial manner.

Though, as said, Mr. Brombacher's principal objective was the visiting of railroad shops, he incidentally found opportunity to visit private shops also in nearly all the countries named. What he saw in some countries in the way of primitive equipment leads him to the conclusion that there is, seemingly at least, a market abroad for more of our specialties. Specifically, in the line of machine tools, the facts in respect of superior output of one line of our tools over any foreign machine tool in the same class which he was in position to impart to directors of foreign shops, seemed to be "a new one" to every head of a shop over there, and he took pains to impart the information to every man in such a position that he visited.

The William B. Pollock Company, Youngstown, Ohio, is building two self-supporting steel stacks, 12 ft. 6 in. in diameter and 225 ft. high, for the new power plant of the Republic Railway & Light Company, Lowellville, Ohio, for which Stone & Webster, Boston, are the contracting engineers.

The Iron and Metal Markets

Further Rail Orders for 1913

A Strong Situation in All Finished Lines

Advances In Billets and Sheet Bars—Pig Iron Higher, with Buffalo Leading in Volume of Sales

The iron and steel situation could hardly develop more satisfactorily to the producer, and the outlook has seldom been better, either for volume of business or for prices that will yield a profit. The past week has established higher prices for pig iron, though the volume of buying was probably somewhat less than in the week preceding. In the finished material market it has accented the conditions of unparalleled operations at mills and of advancing prices on new business.

Indications of a record addition to the country's wealth in this year's crops make railroad buying more than ever the pivotal factor in the steel trade of the coming year. Just added to 180,000 tons of rails reported last week are one lot of 25,000 tons and another of 15,000 tons placed for next year's delivery, and other rail contracts are under negotiation. Among recent second orders for 1912 is 5000 tons of Mayari Bessemer rails placed by the New York Central with the Pennsylvania Steel Company.

It is stated that none of the rail orders for next year were included in the Steel Corporation's tonnage statement of July 31, showing about 150,000 tons more of unfilled orders than on June 30. It is still necessary to point out, however, in view of some current comment on the steel trade, that much the greater part of the business coming to the books of the steel companies represents specifications on old contracts. The most recent prices thus apply as yet to only a fractional part of the whole.

While a note has been sounded here and there against too rapid advances, steel manufacturers seem to be facing the prospect of higher prices with entire complacency. They consider that the various upward steps in the rebuilding of prices will only be compensation, and after many months, for the loss of profits in the past disastrous year.

Plates, structural shapes and bars are the lines in which most of the reported offers of premiums have been made. Construction work that cannot wait has produced many of them. In a number of cases Central Western mills have declined premiums, working in small tonnages, where they could accept them, at current rates. The Eastern plate trade is still conspicuous in the taking of premium business, the bonuses varying from $2 to $5 a ton. There are exceptions to the rule that 1.30c. Pittsburgh, for bars and 1.35c. for plates and shapes apply to small or moderate orders. Some larger contracts have been taken at these prices; and some large buyers have been able to do $1 a ton better. Yet one case is known in which a buyer of bars paid 1.60c. at mill for 3000 tons to insure delivery this year.

As a rule steel manufacturers are not selling for next year's delivery, apart from rails, but some late contracts with manufacturing buyers run into the first quarter of 1913. The confident talk of higher prices heard in some quarters takes little account of the fact that many buyers, on the renewal of present contracts, must face $5 a ton advance, taking the market as it stands. The effect of higher prices on consumption is not to be overlooked.

The structural outlook is promising. For the subway and elevated extensions of the Brooklyn Rapid Transit bids are going in this week on 90,000 tons. For similar work, apart from new lines, the Interborough will want 80,000 tons. The new Equitable Building, New York, will probably require fully 35,000 tons.

Few Central Western steel works are in position to sell billets and sheet bars for the third quarter and demand for such deliveries has only been met at higher prices. A more acute scarcity has developed in the past week, and as high as $22.50 has been paid for billets and $23.50 for sheet bars, Pittsburgh mill, while at Youngstown 50 cents higher has been secured.

Foundry pig iron has advanced rather sharply in the Chicago market, where furnaces are now quoting $15.50 for foundry and malleable, as against $15 last week. Buffalo reports greater activity, with sales above 75,000 tons. Buffalo prices have ranged from $14 to $14.50 for No. 2 X, and large business was done at the former figure. Deliveries are running into 1913 in a good many cases, some sales having been made for the first half. A large Michigan consumer has closed for 20,000 tons, largely in the Cincinnati market. In the St. Louis district one large interest, with plants there and elsewhere, has closed for about 35,000 tons of various descriptions of pig iron.

Southern furnaces could make sales for 1913 at $12.50 for No. 2, but are disposed to hold for a higher price. Virginia irons have sold more freely, one pipe interest taking 7500 tons.

Steel making pig iron is firmer in the Central West. The Pittsburgh Steel Company has bought 18,000 tons of basic for August and September, mostly at $13.85 at furnace.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Aug. 14, 1912.	Aug. 7, 1912.	July 10, 1912.	July 12, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.75	$15.75	$15.75	$15.00
Foundry No. 2, Valley furnace	**14.00**	13.50	13.25	13.50
Foundry No. 2, Southern, Cincinnati	15.00	15.00	14.75	13.25
Foundry No. 2, Birmingham, Ala.	11.75	11.75	11.50	10.00
Foundry No. 2, at furnace, Chicago*	**15.50**	15.00	14.50	15.00
Basic, delivered, eastern Pa.	15.75	15.75	15.50	14.25
Basic, Valley furnace	**14.00**	13.75	13.25	13.25
Bessemer, Pittsburgh	15.40	15.40	15.15	15.90
Malleable Bessemer, Chicago	**15.50**	14.50	14.50	15.00
Gray forge, Pittsburgh	14.15	14.15	13.90	13.90
Lake Superior charcoal, Chicago	16.25	16.25	16.25	16.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt shipment	$2.15	$2.15	$2.25	$1.40
Furnace coke, future delivery	2.25	2.25	2.25	1.55
Foundry coke, prompt shipment	2.40	2.40	2.40	1.80
Foundry coke, future delivery	2.50	2.50	2.50	2.05
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	**22.00**	21.50	21.50	21.00
Open Hearth Billets, Pittsburgh	**22.50**	22.00	21.50	21.00
Forging billets, Pittsburgh	**29.00**	28.00	28.00	26.00
Open hearth billets, Philadelphia	24.40	24.40	24.40	23.40
Wire rods, Pittsburgh	25.50	25.50	25.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	14.00
Iron rails, Philadelphia	16.50	16.50	16.50	16.75
Car wheels, Chicago	13.50	13.50	14.00	12.50
Car wheels, Philadelphia	14.00	14.00	14.00	12.75
Heavy steel scrap, Pittsburgh	13.50	13.50	13.50	13.00
Heavy steel scrap, Chicago	**12.00**	11.75	11.50	10.50
Heavy steel scrap, Philadelphia	**13.75**	13.50	13.50	13.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel, Per Pound to Largest Buyers:	Aug. 14, 1912. Cents.	Aug. 7, 1912. Cents.	July 10, 1912. Cents.	July 12, 1911. Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.37½	1.32½	1.32½	1.27½
Iron bars, Pittsburgh	1.40	1.40	1.35	1.25
Iron bars, Chicago	1.40	1.40	1.30	1.20
Steel bars, Pittsburgh	1.30	1.30	1.25	1.25
Steel bars, tidewater, New York	1.46	1.46	1.41	1.41
Tank plates, Pittsburgh	1.35	1.35	1.30	1.35
Tank plates, tidewater, New York	1.51	1.51	1.46	1.51
Beams, Pittsburgh	1.35	1.35	1.30	1.35
Beams, tidewater, New York	1.51	1.51	1.46	1.51
Angles, Pittsburgh	1.35	1.35	1.30	1.35
Angles, tidewater, New York	1.51	1.51	1.46	1.51
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.20	1.25
Skelp, sheared steel, Pittsburgh	1.30	1.30	1.25	1.35
Sheets, Nails and Wire, Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	1.90	2.00
Wire nails, Pittsburgh	1.65	1.65	1.60	1.70
Cut nails, Pittsburgh	1.60	1.55	1.55	1.60
Fence wire, ann'led, 0 to 9, Pgh.	1.45	1.45	1.40	1.50
Barb wire, galvanized, Pittsburgh	1.95	1.95	1.90	2.00
Metals, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	17.75	17.75	17.50	12.75
Electrolytic copper, New York	17.62½	17.62½	17.37½	12.55
Spelter, St. Louis	7.05	7.10	7.10	5.60
Spelter, New York	7.20	7.25	7.25	5.80
Lead, St. Louis	4.35	4.35	4.67½	4.35
Lead, New York	4.50	4.50	4.75	4.51
Tin, New York	45.87½	45.12½	44.62½	43.50
Antimony, Hallett, New York	7.87½	7.87½	7.75	8.12½
Tin plate, 100-lb. box, New York	$3.74	$3.74	$3.64	$3.94

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox-steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $25.50. Fence wire, Nos. 0 to 9, per 100 lb., terms, 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.45; galvanized, $1.75. Galvanized barb wire, to jobbers, $1.95; painted, $1.65. Wire nails to jobbers, $1.65.

The following table gives the price to retail merchants on wire in less than carloads, including the extras Nos. 10 to 16, which are added to the base price:

Fence Wire per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.60	$1.65	$1.70	$1.75	$1.85	$1.95	$2.05	$2.15
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.35c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.40 to 1.45
H-beams over 18 in.	1.40 to 1.45
Angles over 6 in.	1.40 to 1.45
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909	1.40 to 1.45
Tees, 3 in. and up	1.40 to 1.45
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909	1.40 to 1.45
Deck beams and bulb angles	1.65 to 1.70
Hand rail tees	2.10 to 2.25
Checkered, trough and corrugated floor plates	2.25 to 2.50

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 3 ft. inclusive	.25
Under 2 ft., to 1 ft. inclusive	.50
Under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.40
Nos. 9 and 10	1.45
Nos. 11 and 12	1.50
Nos. 13 and 14	1.55
Nos. 15 and 16	1.65

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12	1.65 to 1.70
Nos. 13 and 14	1.70 to 1.75
Nos. 15 and 16	1.75 to 1.80
Nos. 17 to 21	1.80 to 1.85
Nos. 22, 23 and 24	1.85 to 1.90
Nos. 25 and 26	1.90 to 1.95
No. 27	1.95 to 2.00
No. 28	2.00 to 2.05
No. 29	2.05 to 2.10
No. 30	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.10 to 2.15
Nos. 12, 13 and 14	2.20 to 2.25
Nos. 15 and 16	2.35 to 2.40
Nos. 17 to 21	2.50 to 2.55
Nos. 22, 23 and 24	2.60 to 2.65
Nos. 25 and 26	2.80 to 2.85
No. 27	2.95 to 3.00
No. 28	3.10 to 3.15
No. 29	3.20 to 3.25
No. 30	3.40 to 3.45

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following:

Corrugated Roofing Sheets by Weight.

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., as announced by most of the leading sheet manufacturers, are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

	Gauges, cents per 100 lb.			
Painting.	29	25 to 28	19 to 24	12 to 18
Regular or oiling	...	0.15	0.10	0.05
Graphite, regular	...	0.25	0.15	0.10
Forming.				
2, 2½, 3 and 5 in. corrugated	0.05	0.05	0.05	0.05
2 V-crimped, without sticks	0.05	0.05	0.05	...
¾ to 1¼ in. corrugated	0.10	0.10	0.10	...
3 V-crimped, without sticks	0.10	0.10	0.10	...
Pressed standard seam, with cleats	...	0.15	0.15	...
Plain roll roofing, with or without cleats	0.15	0.15	0.15	...
Plain brick siding	...	0.20	...	...
3-15-in. crimped	0.20	0.20	0.20	...
Weatherboard siding	...	0.25	0.25	...
Beaded ceiling	...	0.25	0.25	...
Rock, face brick and stone siding	...	0.25	0.25	...
Roll and cap roofing, with caps and cleats	0.25	0.25	...	...
Roofing valley, 12 in. and wider	...	0.25	0.25	...
Ridge roll and flashing (plain or corrugated)	...	0.65	0.65	0.65

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¾ to 2¼ in.	63	1½ in.	48
2½ in.	65½	1¾ to 2¼ in.	50
2¾ to 3¼ in.	70½	2½ in.	53
3½ to 4 in.	73	2¾ to 3¼ in.	57½
5 to 6 in.	65½	3½ to 5 in.	60
7 to 13 in.	63		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for

carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Wrought Pipe.—The following are the jobbers' carload discounts (card weight) on the Pittsburgh basing card on steel pipe, in effect from July 24, 1912; iron pipe from August 12, 1912, one point greater being allowed on merchant weight:

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ in.	72	52	..	..
⅜ in.	73	63	67	51
½ in.	76	66	70	57
¾ to 1½ in.	79	71	73	62
2 to 3 in.	80	73	74	63
Lap Weld.				
1½ in.	..	..	68	57
2 in.	77	70	70	61
2½ to 4 in.	79	72	72	64
4½ to 6 in.	78	70	71	63
7 to 12 in.	76	66	69	59
13 to 15 in.	53	..	45	..
Plugged and Reamed.				
1 to 1½ in., butt weld	77	69	71	60
2 to 3 in., butt weld	78	71	72	61
2 in., lap weld	75	68	68	59
2½ to 4 in., lap weld	77	70	70	62
Butt Weld, extra strong, plain ends, card weight.				
⅛, ¼, ⅜ in.	68	58	63	53
½ in.	73	67	68	61
¾ to 1½ in.	77	71	72	63
2 to 3 in.	78	72	73	64
Lap Weld, extra strong, plain ends, card weight.				
1½ in.	..	..	62	54
2 in.	74	68	69	61
2½ to 4 in.	76	70	71	64
4½ to 6 in.	75	69	70	63
7 to 8 in.	68	58	63	53
9 to 12 in.	63	53	58	48
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	63	57	58	50
¾ to 1½ in.	66	60	61	53
2 to 2½ in.	68	62	63	55
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	64	58	59	50
2½ to 4 in.	66	60	61	55
4½ to 6 in.	65	59	60	54
7 to 8 in.	58	48	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Pittsburgh

PITTSBURGH, PA., August 14, 1912.

The sales departments of the leading steel interests state that there is no falling off in specifications against contracts, while new orders so far in August are said to be ahead of the first half of July. It is a seller's market absolutely, and customers are wiring, telephoning and doing everything they can to secure quicker shipments, but usually with little success. The present heavy demand is not speculative, but is to meet actual consumption, which, in all lines of finished iron and steel, is the greatest ever known. Most of the mills rolling iron and steel products are practically filled for the remainder of this year, and offers of premiums for quick shipments are more numerous, but as a rule are refused. The scarcity of semi-finished steel and of labor continues to interfere with output, and conditions in this respect are likely to get worse before they are better. As an instance of how some of the mills are switching business, the Illinois Steel Company is having standard section rails rolled at the Lorain, Ohio, plant of the National Tube Company, which is a girder rail proposition. The American Sheet & Tin Plate Company is operating only half of its completed sheet mills at Gary, Ind., being unable to get steel to run them all. The successive advances in prices have not shut off business, and the mills, as regards deliveries, are worse off now than they were July 1. Pig iron was the last item to feel the improvement, but it is now in heavy demand and prices are better. The steel situation is tight, and offers of premiums for billets and sheet bars are frequent. Sheets and tin plate are very strong, and an advance of $1 a ton on blue annealed sheets will likely be made before the week is ended. Pipe, wire and other finished products are in heavy demand, while scrap is showing some improvement. Furnace coke is firm at $2.25 for the remainder of the year and there has been some buying. A serious car shortage now exists in some sections, and it will be worse when the crops begin to move.

Pig Iron.—There is a fair amount of new inquiry. Reliable reports are that the Pittsburgh Steel Company has contracted for about 18,000 tons of basic for delivery through August and September for which it is said to have paid about $13.85 at Valley furnace, equal to $14.75, Pittsburgh. Part may have been bought at a slightly lower price. A local interest bought 3000 tons of standard Bessemer for ingot mold purposes at $14.50, Valley, for delivery through this year. Sales of No. 2 foundry for remainder of the year delivery have been made at $14, Valley furnace. We also note a sale of 500 tons of No. 2 foundry at $14 and a sale of 600 tons, on which a previous option had been given, at $13.85, furnace. The market on basic, No. 2 foundry and malleable Bessemer is 25c. a ton higher than last week. At last the pig iron market is controlled by the sellers, and they are able to get the higher prices being quoted. Unless more furnaces go in blast, still higher prices are predicted. We quote: Standard Bessemer iron, $14.50; malleable Bessemer, $13.75 to $14; No. 2 foundry, $14; basic, $14; and gray forge, $13.25 to $13.50, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton. The Carnegie Steel Company, which is operating 47 out of its 59 blast furnaces, has six or seven stacks that are being relined and repaired, and they will be blown in as soon as they are ready.

Steel Billets and Sheet Bars.—The shortage of steel has reached a more acute stage, and consumers who are not covered by regular sources of supply are now compelled to pay higher prices and their contracts are being taken subject to shipment at convenience of the mill. The past week open hearth sheet bars have sold as high as $23.50 to $24, where the seller agreed to make deliveries inside of six weeks. The prices to rule on billets and sheet bars for delivery in fourth quarter on running contracts have not yet been fixed by the mills, but they will be considerably higher than in the present quarter. We have advanced prices on both Bessemer and open hearth billets and sheet bars and now quote: Bessemer billets, $22 to $22.50; Bessemer sheet bars, $22.50 to $23; open hearth billets, $22.50 and open hearth sheet bars $23 to $23.50, f.o.b. mill, Pittsburgh. The Youngstown mills are quoting and are getting slightly higher prices for steel than are ruling in the Pittsburgh district, and we quote, f.o.b. Youngstown mill, Bessemer billets, $22.50; Bessemer sheet bars, $23; open hearth billets, $23; and open hearth sheet bars, $23.50 to $24.

Ferroalloys.—There is a moderate amount of new inquiry for ferrosilicon and ferromanganese in small lots for the remainder of the year, and some inquiries are out for ferromanganese for first half. There is still a scarcity of ferromanganese for prompt shipment and $52 to $53, Baltimore, is quoted. We note sales of 100 to 150 tons of 80 per cent. at these prices. We quote 80 per cent. English ferromanganese for forward delivery at $51, Baltimore, the rate to the Pittsburgh district being $1.95 a ton. We quote 50 per cent. ferrosilicon in lots up to 100 tons at $72.50; over 100 tons to 600 tons, $71.50, and over 600 tons, $70.50, Pittsburgh. The lower grades are ruling at $20 for 10 per cent., $21 for 11 per cent., and $22 for 12 per cent., f.o.b. cars at Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots, 10c. per lb. in 2000-lb. lots and over, and 12½c. per lb. in lots up to 2000 lb.

Wire Rods.—More sales of wire rods have been made in this market than for some time. Specifications against contracts are coming in freely, and prices are slightly higher. Sales of open hearth rods for delivery over the remainder of the year are reported at $26, Pittsburgh. We quote Bessemer, open hearth and chain rods at $25.50 to $26, Pittsburgh, with two of the leading local makers reported as holding rods firm at the higher price named.

Muck Bar.—There is more inquiry for muck bar than for some time, but the available supply is limited. A sale of 500 tons is reported to have been made at about $30, Pittsburgh. We quote best grade of muck bar, made from all pig iron, at $30 to $30.50, Pittsburgh.

Skelp.—The local market is very strong, the mills being pretty well sold up over the next two or three months. Prompt deliveries are hard to obtain. A sale of 1000 tons of grooved steel skelp is reported to have been made at about 1.30c., delivered at buyer's mill in the Pittsburgh district. We quote grooved steel skelp at 1.25c. to 1.30c.; sheared steel skelp at 1.30c. to 1.35c.; grooved iron skelp, 1.70c. to 1.75c., and sheared iron skelp, 1.75c. to 1.80c., delivered at buyer's mill in the Pittsburgh district.

Steel Rails.—Orders for standard sections in small lots are coming in more freely and specifications against contracts are very active. The Carnegie Steel Company is reported to have sold 3800 tons to the Carolina & Clinchfield Railroad, and in addition has taken good or-

ders for both standard sections and light rails for export. The new demand for light rails is quite active and it is likely that another advance in prices will be made in the near future. The Carnegie Steel Company received new orders and specifications last week for about 4200 tons of light rails. We quote splice bars at 1.50c. per lb., and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb., 1.34c.; 12 and 14-lb., 1.29c.; 16 and 20-lb., 1.24c.; 25, 30, 35, 40 and 45-lb., 1.19c., in carload lots, f.o.b. Pittsburgh.

Structural Material.—New inquiry is active. Several of the local fabricators are now so well filled that they are not bidding on new work except for delivery very late this year or early next year. The Virginia Bridge & Iron Company, Roanoke, Va., has taken 1400 tons of steel for the Memphis Trust Company's building in Memphis, Tenn., and 500 tons for the Chamber of Commerce building at Richmond, Va. The McClintic-Marshall Construction Company of this city has taken about 300 tons for steel buildings for the Columbus Machine & Tool Company, Columbus, Ohio, and from the Youngstown Sheet & Tube Company, Youngstown, has secured about 1700 tons for a new casting house and extensions to several present buildings. It is stated that the Lima Locomotive Corporation, Lima, Ohio, has placed 2200 tons with the Worden-Allen Company, Milwaukee, Wis., for new buildings. New plans are being made for the Magee Memorial Hospital in this city, and bids will soon be asked on about 1800 tons for this project. The market on shapes is very strong, all mills quoting 1.35c., while on work for extended delivery 1.40c. or higher is being named. It is conceded that it will only be a short time until shapes are put at 1.40c. and perhaps higher. We quote beams and channels up to 15 in. at 1.35c. to 1.40c., Pittsburgh.

Steel Plates.—Some important orders for steel cars were placed the past week and others are pending. The Cambria Steel Company has taken a contract for 1000 steel gondola cars for the Buffalo, Rochester & Pittsburgh, while the Canadian Pacific has placed either 3000 or 4000 steel frame box cars with the Barney & Smith Car Company, Dayton, Ohio, and has an option on 1000 more cars from the same interest. The Pennsylvania Lines West has placed 1000 automobile cars with the American Car & Foundry Company and 500 with the Pressed Steel Car Company. The Grand Trunk Railroad has ordered 2000 box cars from the Pressed Steel Car Company and a Virginia road 700 hopper cars. The Boston Coal Company has given an order for 400 steel hopper cars to the Cambria Steel Company. Active inquiries include 500 ventilated box cars for the San Antonio & Aransas Pass; 200 steel underframe box cars and 200 flat cars for the Nashville, Chattanooga & St. Louis and 100 automobile cars for the Canadian Pacific. In addition to its order just placed with the Cambria Steel Company, the Buffalo, Rochester & Pittsburgh is reported to be in the market for 450 box cars, 500 gondolas, 50 automobile cars and 100 furniture cars. The Charlotte Harbor & Northern Railroad is in the market for 30 phosphate cars; the Chicago, Milwaukee & St. Paul for 10 steel passenger coaches, the St. Louis & San Francisco for 10 steel passenger cars and the New York Central for 25 car bodies. The city of Akron, Ohio, is making extensions to its waterworks and will use 6000 to 8000 tons of steel plates in the work, provided it does not decide to use cast iron pipe. The Treadwell Construction Company, Midland, Pa., has taken a contract for another section of the Los Angeles, Cal., aqueduct, and is in the market for about 6000 tons of plates for reasonably prompt delivery. All the local plate mills are practically filled up for this year and plates for prompt delivery can hardly be obtained at any price. Premiums of $2 a ton have been offered in a number of cases for plates for delivery within six weeks from date of order. We quote ¼ in. and heavier plates at 1.35c. to 1.40c., f.o.b. Pittsburgh.

Bars.—New business in steel bars is still coming in very freely, and specifications against contracts are being received in unprecedented volume. In fact, tonnage is piling into the mills at such a rate that they are absolutely unable to catch up on deliveries and are anywhere from six weeks to three months behind. The new demand and specifications for iron bars are also very heavy, and the iron bar mills are considerably back in deliveries. There seems to be no doubt that the iron and steel bar mills will run to full capacity over the remainder of this year at least. We quote steel bars on new orders at 1.30c. and iron bars at 1.40c., f.o.b. Pittsburgh.

Sheets.—The demand for sheets continues very heavy and specifications against contracts are coming in so fast that the mills are getting further behind in shipments. It is likely that within the next two or three days an advance of $1 a ton will be made on blue annealed sheets, which will put the base price of Nos. 9 and 10 gauge at 1.50c. The American Sheet & Tin Plate Company is operating to about 90 per cent. of its capacity, and in fact all the sheet mills are running as full as the supply of steel and labor will permit. Premiums are being offered on sheets for reasonably prompt shipments. We quote No. 28 box annealed, one-pass cold rolled sheets at 2c. to 2.05c., and No. 28 galvanized at 3.10c. to 3.15c. at mill. Some of the jobbers who have stocks bought at lower prices than are ruling now are offering to sell on desirable orders at slightly less than mill prices. We also note that several of the leading sheet mills are holding No. 28 black sheets firm at 2.05c. and No. 28 galvanized at 3.15c. minimum and will not shade these prices.

Tin Plate.—Makers of tin plate continue to be solicited by their customers to accept contracts for delivery in first quarter and first half of next year at present prices, but these offers are being turned down, the mills stating they do not propose to sell for next year's delivery until they know what their steel and tin are going to cost. A fair amount of new business is being placed at the full price of $3.50 per base box. The commitments of the mills are so heavy that they are assured absolutely full operations up to the close of the year. The American Sheet & Tin Plate Company is running to 94 per cent. of capacity, and would be operating additional hot tin mills but cannot get the steel to run them, while the other makers are operating to as full capacity as the supply of labor and steel will permit and are sold up for the remainder of this year. We continue to quote 100-lb. cokes at $3.50 per base box, f.o.b. Pittsburgh.

Hoops and Bands.—The new demand is fairly heavy and specifications against contracts on both hoops and bands are coming in very freely, the mills being six weeks to two months or longer behind in deliveries. We quote steel bands at 1.30c., with extras as per the steel bar card, and hoops at 1.40c. to 1.45c., f.o.b. at mill, the latter price being obtained where reasonably prompt shipments are specified.

Shafting.—All the shafting makers report they are filled up for the next two or three months and are considerably back in shipments. The new demand is more active than for some time and specifications are coming in very freely. We quote cold rolled shafting at 64 per cent. off in carload and larger lots and 59 per cent. off list in less than carloads delivered in base territory.

Spelter.—The market is fairly strong and we quote prime grades of Western at 6.80c., East St. Louis, equal to 6.92½c., Pittsburgh. A sale of 50 tons for August delivery is reported at this price.

Railroad Spikes.—The market is very strong and the spike makers are filled up for two or three months and are considerably back in shipments. We quote standard railroad spikes, base sizes, 5½ x 9/16 in., at $1.65 and small railroad and boat spikes at $1.70 to $1.75 per 100-lb., f.o.b. Pittsburgh.

Wire Products.—The new demand for wire and wire nails is more active, and the makers report that specifications against contracts are coming in quite freely. The situation in the wire trade from all points of view is much better than it has been in a very long time, and predictions are heard that another advance of $1 a ton will shortly be made. We quote wire nails at $1.65; cut nails, $1.60; galvanized barb wire, $1.95; painted, $1.65; annealed fence wire, $1.45, and galvanized fence wire, $1.75, f.o.b., Pittsburgh, usual terms, freight added to point of delivery.

Merchant Steel.—New demand and specifications are heavy and all the mills making merchant steels are from four to eight weeks back in deliveries. Prices are firm and we quote: Iron finished tire, 1½ x ¾ in. and larger, 1.25c., base; under ¾ in., 1.35c; planished tire, 1.45c.; channel tire, ¾, ⅞ and 1 in., 1.70c.; 1⅛ in. and larger, 1.60c.; toe calk, 1.75c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.60c.; cutter shoes, tapered or bent, 2.20c.; spring steel, 1.80c.; machinery steel, smooth finish, 1.60c., all f.o.b. cars, Pittsburgh.

Merchant Pipe.—The order for 22 miles of 12-in. pipe referred to last week as having been placed for delivery at Huntington, W. Va., was taken by the National Tube Company. The new demand for merchant pipe continues very heavy, and all the pipe mills are pretty well sold up for the next three or four months, and are considerably back in deliveries. It seems assured that the pipe mills will continue to operate to full capacity over the remainder of this year. The new discounts on both iron and steel pipe are being firmly held.

Boiler Tubes.—The demand for locomotive and merchant tubes and for seamless tubes continues very heavy, with all the makers from six to eight weeks or more back in deliveries. One leading maker of seamless tubes is practically sold up for the remainder of this year. It is stated that discounts are being firmly held and higher prices in the near future are predicted.

Iron and Steel Scrap.—A moderate amount of scrap is being sold by dealers to consumers, and the market is firm, but not any higher. Consumers claim that the prices they are receiving for the finished product do not justify higher prices for scrap. We note sales of 2000 to 3000 tons of heavy steel scrap made in the past week at $13.50 and in some cases up to $13.75 for selected grades. We also note a sale of 500 tons of machine shop turnings at about $10.10, delivered at buyer's mill in the Pittsburgh district. Dealers quote as follows, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$13.50 to $13.75
No. 1 foundry cast	13.00 to 13.25
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.25 to 12.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	15.00 to 15.25
No. 1 railroad malleable stock	13.00 to 13.25
Grate bars	9.75 to 10.00
Low phosphorus melting stock	16.00 to 16.25
Iron car axles	24.50 to 25.00
Steel car axles	16.50 to 16.75
Locomotive axles	25.00 to 25.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.00 to 10.25
†Sheet bar crop ends	14.75 to 15.00
Old iron rails	15.75 to 16.00
No. 1 wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.00 to 11.25
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The local coke market has quieted down to some extent, but prices are firm and there is a good deal of inquiry. We note sales of 8000 to 10,000 tons of standard grade furnace coke for prompt shipment at $2.25 to $2.30 per net ton at oven. We quote prompt furnace coke at $2.15 to $2.25; on contracts for delivery over the remainder of the year $2.25; prompt foundry coke $2.40 to $2.50, and on contracts $2.50 to $2.75, all per net ton at oven. The output of coke in the Upper and Lower Connellsville regions last week was 379,157 tons, an increase over the previous week of nearly 65,000 tons.

Chicago

CHICAGO, ILL., August 14, 1912. (*By Telegraph.*)

Pig Iron.—An active interest in pig iron for shipment both during the last and first quarter is being generally displayed in this territory. Buying is the more spirited when considered in the light of the advance of local iron to the basis of $15.50 for No. 2 foundry, malleable Bessemer, and basic, f.o.b. furnace. On the new basis a considerable number of sales have been made in lots from 1000 to 2000 tons. The advance carries with it a premium for first quarter delivery and considerable interest is attaching to the volume of business taken on the basis of $16 at the furnace. During the early part of the week the price of $15 still obtained, but furnaces are now standing firmly on the new price. The situation as regards Southern iron is similar, with $12, Birmingham, a minimum, and $12.50 asked on some business. Southern interests, however, are avoiding quotations on inquiries for first quarter delivery and in some cases iron is being taken for shipment during the remainder of the year to be used after January 1. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery on prompt shipments as follows:

Lake Superior charcoal	$16.25 to $16.75
Northern coke foundry, No. 1	16.00
Northern coke foundry, No. 2	15.50
Northern coke foundry, No. 3	15.00
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1 foundry and No. 1 soft	16.85
Southern coke, No. 2 foundry and No. 2 soft	16.35
Southern coke, No. 3	15.85
Southern coke, No. 4	15.35
Southern gray forge	14.85
Southern mottled	14.85
Malleable Bessemer	15.50
Standard Bessemer	16.75
Basic	15.50
Jackson County and Kentucky silvery, 6 per cent	17.40
Jackson County and Kentucky silvery, 8 per cent	18.40
Jackson County and Kentucky silvery, 10 per cent	19.40

(By Mail)

The most interesting recent developments in this market have to do with the steps being taken by railroads toward providing for 1913 requirements and with the effort on the part of jobbers to keep pace with the demand for material out of store. Negotiations have been opened by the principal Western roads covering a large aggregate tonnage. Interest is also being displayed in track fastenings and tie plates. Iron and steel jobbers are finding themselves from ten days to two weeks behind their orders and in some sizes their stocks have been reduced to a minimum. Prices out of store on plates, shapes, bars and blue annealed sheets were advanced this week $1 a ton. Contracts for fabricated structural material reported totaled about 6000 tons, of which the largest item was 3500 tons for the Great Northern Railway station at Minneapolis. Mill orders for structural material, plates and bars continue very light for nearby shipments from local mills, but buyers are expected to open negotiations for midwinter deliveries within the next few weeks. In pig iron increasing strength is being displayed, and asking prices for both Northern and Southern iron are advancing. The local scrap iron market is shaping itself for an advance but is being held in check by the limited buying of consumers.

Rails and Track Supplies.—The interest which the leading railroads are showing with regard to their possible requirements of large tonnages apparently indicates an intention to secure seasonable delivery of 1913 rails by ordering sufficiently in advance. This also applies to track fastenings and the mills are anticipating heavy ordering in the last quarter of this year. Large quantities of tie plates are being taken and the outlook is for their increased use. We quote standard railroad spikes at 1.75c., base; track bolts with square nuts, 2.10c. to 2.15c., base, all in carload lots, Chicago; tie plates, $30 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Locally, the activity in structural material is for the most part routine, with miscellaneous requirements light. Fabricating contracts awarded during the week included 3500 tons for the Great Northern Railway station at Minneapolis, placed with the Minneapolis Steel & Machinery Company; 335 tons for the Kersge store building, Kansas City, Mo., to the Kansas City Structural Steel Company; 120 tons for the Griess-Pfleger Tanning Company, to the Hansell-Elcock Company; 443 tons for the Southern Methodist University at Dallas, Texas, to the Mosher Mfg. Company; 694 tons for pier No. 26 at San Francisco, to the McClintic-Marshall Construction Company; 120 tons for the Utah Light & Railway Company, Salt Lake City, to the Des Moines Bridge & Iron Works; 126 tons for the E. B. Lamman Company, East Chicago, Ind., to the American Bridge Company; 113 tons for the Kansas Chemical Mfg. Company, Hutchinson, Kan., and 388 tons for the International Harvester Company. Store prices for structural material were advanced $1 a ton and we quote for Chicago delivery, mill shipment, 1.53c., and from store 1.90c.

Plates.—The local market on plates grows more constricted as regards delivery each week. Offers of limited tonnages in a narrow range of sizes which have been obtainable on delivery promises of two weeks are now on the basis of at least twice that period. Jobbers likewise are falling behind in supplying their customers and have issued new quotations $1 a ton higher. We quote for Chicago delivery, mill shipment, 1.53c., and from store 1.90c.

Bars.—The bar iron market continues strong, with an increasing proportion of the business being placed on the basis of 1.45c. A minimum of 1.35c. is now being asked for hard steel bars from mill and there is no relief locally in the matter of mild steel bar deliveries. Store prices on soft steel bars have been advanced $1 a ton. We quote as follows: Bar iron, 1.40c. to 1.45c.; hard steel bars, 1.35c.; soft steel bars, 1.48c., and from store, soft steel bars, 1.80c., Chicago.

Sheets.—The only noticeable development in the sheet trade is an increasing firmness in prices, indicating that even the smaller mills have all the orders they can comfortably handle. We quote, Chicago delivery, as follows: Carload lots, from mill, No. 28 black sheets, 2.18c. to 2.23c.; No. 28 galvanized, 3.28c. to 3.33c.; No. 10 blue annealed, 1.63c. Prices from store are: No. 10, 2.05c.; No. 12, 2.10c.; No. 28 black, 2.55c., and No. 28 galvanized, 3.65c.

Rivets and Bolts.—Local jobbers are quoting an advance of $1 a ton on rivets out of store. The demand

for bolts, both from wagon builders and for machine purposes, is maintained with heavy specifications. It is generally conceded that prices are still low as compared with current quotations on steel bars. We quote as follows: Carriage bolts up to ⅜ in. x 6 in., rolled thread, 80 and 12½; cut thread, 80 and 5; larger sizes, 75 and 5; machine bolts up to ⅜ in. x 4 in., rolled thread, 80 and 17½; cut thread, 80 and 10; larger sizes, 75 and 10; coach screws, 80 and 17½; hot pressed nuts, square head, $6.20 off per cwt.; hexagon, $7 off per cwt. Structural rivets, ¾ to 1¼ in., 1.83c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Cast Iron Pipe.—The outlook for the placing of cast iron pipe tonnage includes a proposed letting at Akron, Ohio, for 12,000 tons of 36-in.; a letting at Kansas City, appointed for August 21, for 3500 tons; a letting at Detroit, scheduled for next week, for 6000 tons, and the previously mentioned 25,000 tons for Winnipeg, for which bids will be received August 28. A number of smaller lots are also under consideration. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $27.50; 6 to 12-in., $26.25; 16-in. and up, $25.50, with $1 extra for gas pipe.

Wire Products.—In addition to the activity in wire nails, which is resulting in an unusual aggregate of preponderance, the fall demand for barb wire and fencing is beginning to make itself felt. Fabricators of fence are specifying freely. We quote as follows: Plain wire, No. 9 and coarser, base, $1.63; wire nails, $1.83; painted barb wire, $1.83 to $1.88; galvanized, $2.13; polished staples, $1.88; galvanized, $2.18, all Chicago.

Old Material.—The situation has changed but little, and in this respect has been a disappointment to the selling interests. This is particularly true of rolling mill grades. The advance in pig iron has enhanced the value of cast scrap, but higher prices are not being offered. The movement of material is limited both because dealers are selling as little as possible, hoping that the high rate of production of finished material will necessitate increased buying at higher prices and, on the other hand, because melters are relying on their stocks to as great an extent as possible. The Atchison, Topeka & Santa Fé is offering about 5000 tons, but at this writing has sold little or nothing. The Chicago, Milwaukee & St. Paul took bids on 2500 tons August 9 and the Soo Line is offering 500 tons. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton.	
Old iron rails	$16.00 to	$16.50
Old steel rails, rerolling	13.75 to	14.25
Old steel rails, less than 3 ft.	12.75 to	13.25
Relaying rails, standard section, subject to inspection		24.00
Old car wheels	13.50 to	14.00
Heavy melting steel scrap	12.00 to	12.50
Frogs, switches and guards, cut apart	12.00 to	12.50
Shoveling steel	11.75 to	12.25
Steel axle turnings	9.50 to	10.00
	Per Net Ton.	
Iron angles and splice bars	$14.50 to	$15.00
Iron arch bars and transoms	16.00 to	16.50
Steel angle bars	11.25 to	11.75
Iron car axles	19.75 to	20.25
Steel car axles	15.75 to	16.25
No. 1 railroad wrought	12.25 to	12.75
No. 2 railroad wrought	11.25 to	11.75
Cut forge	11.25 to	11.75
Steel knuckles and couplers	11.25 to	11.50
Steel springs	11.75 to	12.25
Locomotive tires, smooth	12.50 to	13.00
Machine shop turnings	7.25 to	7.75
Cast and mixed borings	6.50 to	7.00
No. 1 busheling	10.25 to	10.75
No. 2 busheling	7.50 to	8.00
No. 1 boilers, cut to sheets and rings	8.50 to	9.00
Boiler punchings	12.50 to	13.00
No. 1 cast scrap	11.75 to	12.25
Stove plate and light cast scrap	10.00 to	10.50
Railroad malleable	12.00 to	12.50
Agricultural malleable	10.50 to	11.00
Pipes and flues	9.25 to	9.75

Philadelphia

PHILADELPHIA, PA., August 13, 1912.

Practically no diminution appears in the volume of new business coming to the steel companies and premiums ranging from $2 to $5 a ton continue to be obtained for prompt shipment. Consumers are making efforts to get contracts entered for fourth quarter requirements and even for delivery into next year, but most mills refuse to consider such business. Inquiry for pig iron is good, although actual business in foundry grades is light. Sellers maintain a firm position, generally refusing to consider forward business. Indefinite inquiries for early 1913 delivery in both foundry and steel making grades are noted. Second half coke has been more active and several contracts have been closed. The old material market is stronger, and moderate sales at higher prices are reported.

Iron Ore.—The market is practically at a standstill, although with the prospect of more furnaces going in, some activity is looked for in the near future. Importations during the week include 12,600 tons of Newfoundland, 6204 tons of Swedish, and 10,050 tons of Cuban ore.

Pig Iron.—The statistical position, as shown by orders on books and stocks on hand, strongly favors the seller. Records of the Eastern Pig Iron Association show a sharp reduction in stocks and a material increase in unfilled orders. Producers are making no effort to force business and the majority hold firmly at 25c. to 50c. a ton above medium quotations for early deliveries and flatly refuse to consider business involving forward delivery. Low stocks on some yards will result in the blowing in of additional furnaces. A seasonable business is moving in the higher foundry grades, confined mostly to small and moderate lots for early delivery. Several producers have booked business at the $15.75, delivered, basis for standard No. 2 X foundry, but the large majority hold firmly at $16 to $16.25, at which they have made some sales. Moderate sales of Virginia No. 2 X foundry have been made at $14, furnace, representing an advance of 25c. The leading interest quotes $13.75, furnace, for No. 2 X for fourth quarter. The withdrawal of the water competitive freight rate between Virginia furnace points and Philadelphia and a number of nearby delivery points will result in a further advance of 20c. a ton on the delivered price at the points affected by the change in rate on rail shipments, which begins September 1. Total purchases of 7500 tons of low grade iron for fourth quarter, by a Virginia pipe maker, who recently inquired for 6000 tons, are reported. One Virginia maker sold 6000 tons at $13, furnace, for No. 3, while 1500 tons went to another producer. Delaware River cast iron pipe makers have not made any extensive purchases during the week, but the leading interest is in the market for 5000 tons. Estimates place unclosed requirements of Delaware River pipe makers for the remainder of the year at 25,000 to 30,000 tons. Very little movement in rolling mill forge iron is noted, and quotations are nominal. Steel making grades are very firm. A lot of 3000 tons of basic at $15.75, delivered, for fourth quarter shipment, was taken by a consumer who closed for a round block reported last week. The same buyer is feeling the market for first quarter requirements, which would aggregate about 30,000 tons, but sellers have, as a rule, refused to consider business of that character, except at a sharp advance. Low phosphorus iron is in moderate demand; sellers are well covered and prices have advanced 25c. a ton. The general consumption of pig iron is increasing and consumers would, in a number of cases, buy for extended estimated requirements if sellers would make prices, but few are willing to quote; in one instance, however, $14.50, furnace, has been named for first and $15, furnace, for second quarter, 1913, Virginia No. 2 X. Prices on all grades are exceedingly firm, with the inside ranges on some grades subject to immediate withdrawal. For early delivery in buyers' yards in this district the following quotations are named for standard brands:

Eastern Pennsylvania No. 2 X foundry	$15.75 to $16.25
Eastern Pennsylvania No. 2 plain	15.50 to 15.75
Virginia No. 2 X foundry	16.55 to 17.00
Virginia No. 2 plain	16.30 to 16.55
Gray forge (nominal)	15.25 to 15.50
Basic	15.75 to 16.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—While $51, Baltimore, is nominally quoted for 80 per cent. ferromanganese, orders are subject to cable confirmation. Firm offers at that basis, covering delivery over the remainder of this year, have been refused, although for first half delivery a moderate volume of business is accepted by some makers. A shortage in ferromanganese for fourth quarter is believed probable. Sales in this district have been extremely light. Very little movement in ferrosilicon, either furnace or 50 per cent grade, is reported.

Billets.—A very heavy demand for both rolling and forging billets is noted. Eastern mills are receiving inquiries for extended delivery from Western consumers, in instances for lots of several thousand tons. Sellers, however, are not inclined to book orders for extended shipments, as they have been able to take on sufficient day to day business, together with contracts already on hand, to keep mills fully engaged, with the bulk of the new orders commanding premiums ranging from $2 to $4 a ton, when early delivery is specified. For inquiries subject to ordinary delivery $24.40, delivered here, is named as a minimum for soft basic open hearth rolling billets, while ordinary forging billets are quoted at $29.40 minimum, delivered in this district.

Coke.—A better movement in furnace coke for second half, as well as early shipment, is noted. One Eastern consumer has closed for 12,500 tons of West Virginia coke at $2 at oven, and a larger tonnage of Connellsville coke at $2.25. Another consumer closed for 15,000 tons of Connellsville for last half at $2.25, while several moderate lots of August-September coke have been sold at close to $2.10 at oven. Foundry coke has not been very active, moderate sales being reported around $2.45 to $2.50 at oven. The following range of prices, per net ton, is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	$4.10 to $4.60
Connellsville foundry coke	4.55 to 4.70
Mountain furnace coke	3.70 to 4.20
Mountain foundry coke	4.15 to 4.30

Old Material.—More active conditions are noted in the leading grades, transactions in a number of instances being at higher prices. Round sales of No. 1 heavy melting steel scrap, involving 5000-ton lots, have been moved at $14, delivered, although $13.75 is now the minimum for odd lots. On the recent railroad lists $14.10 to $14.25, delivered, was paid. Sales of rerolling rails at higher prices are noted, one 500-ton lot bringing $15.50, delivered. A good inquiry for low phosphorus steel scrap is noted, but no sales are reported. Rolling mill grades are firmer; $16, delivered, has been paid for No. 1 railroad wrought, while wrought pipe has been sold at $13. Melters are feeling the market for further supplies, while sellers are inclined to hold for higher prices. The following range of prices about represents the market for early deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	$13.75 to $14.25
Old steel rails, rerolling (nominal)	15.50 to 16.00
Low phosphorus heavy melting steel scrap	17.50 to 18.00
Old steel axles	17.50 to 18.00
Old iron axles	24.00 to 25.00
Old iron rails (nominal)	16.50 to 17.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Wrought iron pipe	13.00 to 13.50
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
Wrought turnings	10.75 to 11.25
Cast borings	9.75 to 10.00
Machinery cast	13.75 to 14.25
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	12.00 to 12.50

Plates.—There has been practically no let up in the demand. Mills in this district are refusing to enter contracts covering extended delivery and therefore are in shape to accept business tendered for early delivery at premiums running as high as $4 to $5 a ton. A considerable volume of the rush business comes from the West. Considerable new business is coming out, including some further moderate inquiry from boat builders. Specifications from locomotive, bridge and car builders have been very heavy. Universal plates are in particularly good demand and are firmly held at an advance over sheared plates. Heavy ordinary plates for reasonable delivery are quoted at 1.50c. to 1.55c., delivered here, while universal plates command 1.55c. to 1.60c.

Structural Material.—While few important projects of large size have developed, fabricators are figuring on several extensive contracts previously reported. Most new business has been confined to small projects, the most interesting being that for the steel requirements for a pier at Atlantic City, N. J., requiring about 600 tons. Makers of plain material are operating at full capacity and find it difficult to meet consumers' requirements. While quotations are practically unchanged at 1.50c. minimum, delivered here, 1.55c. is usually obtained for small lots, and as high as 1.60c., mill, has been paid for prompt shipments. Specifications have been coming out freely and a very satisfactory business in miscellaneous lots is reported.

Sheets.—Irregular advances in prices according to sizes are reported; for carload lots, 1.65c., delivered here, is named for No. 10 gauge Western sheets, while in the lighter gauges advances show irregularity, depending on conditions at the mills. Eastern producers are operating at full capacity and find it difficult to meet delivery requirements. On ordinary business makers of smooth, loose-rolled sheets in this district easily obtain advances of ¼c. to ½c. per lb., and in instances additional premiums for prompt shipment.

Bars.—With deliveries and prices of steel bars hardening, consumers have in many instances been substituting iron bars, and mills in this district have been taking a larger volume of business. The increased demand has also influenced prices, which are very firm at 1.37½c. to 1.42½c., delivered in this vicinity. Mills are more actively engaged than for some months, while inquiries have been steadily increasing. A fair demand for steel bars is noted, but deliveries are unsatisfactory. Prices are firm at 1.45c., delivered here.

Cleveland

CLEVELAND, OHIO, August 13, 1912.

Iron Ore.—A few sales of from 5000 to 15,000 tons have been made to furnace companies that did not purchase their full requirements for the year early in the season. Some inquiry is pending for ore for stacks now out of blast but which will probably be blown in as a result of the improved demand and better prices for pig iron. Ore prices are very firm, the concessions made from regular quotations having disappeared. Shipments down the lakes are being made at about the same rate as in July. We quote prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range non-Bessemer, $3.05; Mesaba non-Bessemer, $2.85.

Pig Iron.—The demand in this territory is not active but considerable inquiry is coming from outlying districts for foundry, basic and malleable grades. There has been a general stiffening up of prices. The usual quotation for No. 2 foundry is now $14, Cleveland furnace, for outside shipment. The same price is being asked by Valley furnaces and some small lot sales have been made on this basis. For local delivery Cleveland furnaces are now asking $14.25 to $14.50, delivered, for the remainder of the year but no sales are reported at these advanced prices. There is some inquiry for foundry grades for the first quarter of next year. Furnace interests prefer not to sell at present for that delivery but are asking $14.25 to $14.50 at furnace for No. 2 for the first quarter. A Canton, Ohio, consumer is reported to have bought, last week, 2500 tons of basic for the fourth quarter at $13.75, delivered, or $13 Cleveland furnace. This purchase was followed with an offer of $13.50 at furnace for a similar tonnage for the same delivery but the buyer was unable to secure the additional iron in this market at the advance in price. The sale of 1100 tons of Southern foundry iron is reported for Western shipment for the first quarter delivery at $12.50, Birmingham, for No. 3. The consumption by foundries is heavy and some consumers are specifying iron in excess of the tonnage due on contract. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	$15.40
Basic	$14.00 to 14.25
Northern No. 2 foundry	14.00 to 14.25
Southern No. 2 foundry	16.10 to 16.35
Gray forge	13.50 to 13.75
Jackson County silvery, 8 per cent. silicon	17.55 to 18.05

Coke.—The consumption of foundry grades is heavy and there is some complaint of inability to secure shipments promptly. The new demand is light, nearly all consumers being under contract. Prices are practically stationary. The general quotation for standard Connellsville furnace coke is $2.25 for prompt shipment and contract. We quote standard 72-hour Connellsville foundry coke at $2.50 to $2.75 per net ton at oven for spot shipment and future delivery.

Finished Iron and Steel.—The congested condition of the mills is causing some interest among consumers in the matter of getting material for delivery next year and some inquiry has come out for the first half. Mills generally, however, will not quote for delivery beyond December. One sale of steel bars is reported at 1.35c., Pittsburgh, for the first quarter and at 1.40c. for the second quarter. The situation in regard to deliveries appears to be growing worse and some manufacturers and structural fabricators are seriously handicapped. Considerable inquiry is coming out, but much of this is from consumers who are already under contract, but who are trying to secure early deliveries from other sources. Steel bars are firm at 1.30c., Pittsburgh. A local producer reports the sale of a round tonnage on that basis for shipment outside of this territory. Premiums up to $6 a ton are being paid for quick delivery. On plates and structural material 1.35c., Pittsburgh, is the usual quotation, but $2 to $3 a ton higher is being paid for prompt shipment. Bids for the Superior avenue bridge, Cleveland, requiring about 4000 tons of steel, will be received August 24. Sheets are firm and in fair demand at 2.05c. for No. 28 black and 3.15c. for No. 28 galvanized. The demand for rivets is very heavy and a local purchaser has advanced prices to 1.80c., Pittsburgh, for structural and 1.90c. for boiler rivets. There is a fair demand for forging billets which are now selling in this market at $29.50 to $30, Pittsburgh. The demand for bar iron is fairly active.

The price is firm at 1.40c., Cleveland mill. Local warehouse prices are unchanged at 1.75c. for bars and 1.95c. for plates and shapes. However, an advance in these prices is expected.

Old Material.—The market is quieter than in the previous week or two. Consumers are holding back shipments and a less active demand has resulted in a slight weakening of prices, particularly on material that must be moved quickly. With the new demand from mills rather light dealers are not buying freely. Dealers are asking $13.25 for heavy melting steel, but $13 appears to be the maximum that local mills are willing to pay. Dealers are looking for considerable buying within the next few weeks, with firmer prices. The Michigan Central Railroad closed August 12 on its scrap list. The Norfolk & Western list will close August 15. Dealers' prices, f.o.b. Cleveland, are as follows:

Per Gross Ton.

Old steel rails, rerolling	$12.75 to $13.00
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	12.75 to 13.25
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	13.00 to 13.25
Light bundled sheet scrap	10.00 to 10.50

Per Net Ton.

Iron car axles	$18.50 to $19.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	8.00 to 8.25
Steel axle turnings	8.50 to 8.75
No. 1 busheling	11.00 to 11.25
No. 1 railroad wrought	12.50 to 13.00
No. 1 cast	11.50 to 12.00
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, August 14, 1912. (*By Telegraph.*)

Pig Iron.—There is a generally optimistic feeling as to the future. While there have been a number of quiet inquiries put out by a few of the larger consumers, contracting in this immediate territory is comparatively more limited than in other markets. A Western melter passed an order through a local house for 1200 tons of Southern No. 3 foundry for August-December shipment, based on $12, Birmingham, for No. 2 foundry. At this same price 450 tons of No. 2 foundry was taken by a Central Western consumer. An Indiana manufacturer contracted for 1000 tons each of Northern and Southern foundry. The largest reported purchase was made by a Michigan consumer who contracted for about 20,000 tons of Northern and Southern foundry grades, with deliveries extending through the first half of next year. The central Ohio melter mentioned last week is understood to have purchased a 6000-ton mixed lot of malleable and Northern and Southern foundry grades, most of which tonnage is understood to have been taken by a nearby furnace interest. A melter in St. Louis territory bought 300 tons of Southern No. 1 foundry at $12.50, Birmingham, for prompt shipment. About 2000 tons of malleable was taken by a central Ohio buyer for last half movement. Other sales include 600 tons of Lake Superior charcoal to a northern Ohio melter and 200 tons of Jackson County silvery for shipment to Michigan. Northern prices on both foundry and malleable are stronger, and $14 for any shipment this year is now considered minimum, although it is possible to obtain a small quanity of resale iron below this quotation. For next year's delivery, those who are quoting ask a permium of 50c. a ton over their fourth quarter prices, but a few sales have been made with deliveries extended through the first quarter of 1913 at last half quotations. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$15.25 to $15.75
Southern coke, No. 2 foundry and 2 soft	15.00 to 15.50
Southern coke, No. 3 foundry	14.50
Southern coke, No. 4 foundry	14.25
Southern gray forge	14.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.45
Southern Ohio coke, No. 2	15.20
Southern Ohio coke, No. 3	14.70
Southern Ohio malleable Bessemer	15.20
Basic, Northern	14.70
Standard Southern car wheel	25.75 to 26.00
Lake Superior charcoal	16.75 to 17.25

(By Mail)

Coke.—There is not much of a demand for foundry coke, in spite of increasing activity with the foundries in this section, but an improvement is looked for shortly. Specifications on foundry contracts, previously made, are very good. There has been more furnace business booked here than for some time, although the quantity involved is not large. A Pocahontas producer signed up with a furnace operator in the Hanging Rock district for a supply of 5000 to 6000 tons a month, to be delivered during the last quarter. For last half shipment three contracts averaging about 5000 tons a month each, for Northern consumers, were signed up with Connellsville interests. Connellsville standard 48-hr. brands are held around $2.25 to $2.50 per net ton at oven, though it is reported that as low as $2.15 has been done on a small amount for prompt shipment. Pocahontas furnace coke is held at $2 for any shipment this year, but Wise County producers are asking a slight advance over these figures. Connellsville foundry coke is quoted around $2.50 to $2.75 per net ton at oven, and Pocahontas 72-hr. at from $2.25 to $2.40. Wise County agencies are asking $2.75, but this figure can be shaded.

Finished Material.—Mill agencies are more concerned just now over their ability to make deliveries on time than anything else. At least one large concern is not anxious for any nearby business, as on certain commodities it is booked far ahead of capacity for the next three months. The impending car shortage has induced the warehouses to order stocks that have been lately depleted; warehouse quotations have advanced considerably. The local warehouses are now asking 1.75c. to 1.80c. for steel bars, and all the way from 1.85c. to 1.95c. for structural material, cut to lengths, when desired. Mill prices are firm at 1.30c. for steel bars and 1.35c. for structural material.

Old Material.—Dealers are feeling more optimistic. There is not much new business, as many of the larger rolling mill consumers booked fair-sized tonnages when prices were at a low level. The foundry trade is taking a slightly larger amount of scrap, and the consumption is doubtless steadily increasing, especially with those foundries making a specialty of railroad castings. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' selling prices f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$9.25 to $9.75
Old iron rails	13.00 to 13.50
Relaying rails, 50 lb. and up	20.25 to 21.25
Rerolling steel rails	11.25 to 11.75
Melting steel rails	10.25 to 10.75
Old car wheels	12.50 to 13.00

Per Net Ton.

No. 1 railroad wrought	$10.75 to $11.25
Cast borings	6.50 to 7.00
Steel turnings	7.25 to 7.75
No. 1 cast scrap	11.00 to 11.50
Burnt scrap	7.75 to 8.25
Old iron axles	17.25 to 17.75
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	7.25 to 7.75
Malleable scrap	8.75 to 9.25
Railroad tank and sheet scrap	6.75 to 7.25

Birmingham

BIRMINGHAM, ALA., August 12, 1912.

Pig Iron.—The Birmingham pig iron market is so strong on the basis of $12 that a higher price appears imminent. One maker has now sold a total of 33,000 to 35,000 tons for fourth quarter delivery on the $12 basis and is indifferent as to any further bookings. During the week it disposed of 750 tons of various grades on the $12 basis and received $11.25 for a small lot of gray forge. It would be easy at this time to sell small lots in the South over $12. All special irons are bringing premiums over that figure now, small lots of silvery gray going at $13.75 to $14. Another operator sold 1500 tons of No. 4 during the week at $11.50 for delivery during the rest of the year. Several companies admit receiving inquiries for first quarter of 1913, but so far have not opened their books. One considerable offer for the first quarter of 1913 on the basis of $12.50 was turned down for the time being. Sales are in satisfactory volume and perhaps increasing. One thousand tons of iron was shipped to Genoa during the week. The makers do not seem to be in a hurry for a higher market, but they unite in the expectation of $12.50 by October at latest, and many look for $13 as the basis for next year's business. Home consumption continues to play an important part in maintaining the strength of Alabama iron. Regular minimum quotations, f.o.b. cars, Birmingham furnaces, are as follows:

No. 1 foundry and No. 1 soft	$12.00 to $12.50
No. 2 foundry and No. 2 soft	11.75 to 12.00
No. 3 foundry	11.25 to 11.50
No. 4 foundry	10.75 to 11.25
Gray forge	10.50 to 11.00
Basic	11.50 to 12.00
Charcoal iron	22.50 to 23.00

Cast-Iron Pipe.—Several Texas points figure in the new orders that have been received by the local pipe plants. Shipments are equal to the make, there are no accumulations, and prices are firm with a tendency to advance. The Dimmick plant at North Birmingham, now belonging to the United States Cast Iron Pipe & Foundry Company, will soon be ready to resume operations. Pipe quotations are firm as follows, per net ton, f.o.b. cars at pipe yards: 4 in., $24; 6 to 8 in., $22; 10 in and over, $21.50.

Coal and Coke.—Coke is slightly more active and some additional ovens will be fired in the immediate future. Prices remain the same, namely, $3.25 to $3.75 per net ton at oven. There is a small demand for spot steam coal, but orders for delivery later on when the cotton crop moves and factories will work up the by-products are coming in with some regularity, while the bunker coal business at New Orleans and Mobile holds out good prospects.

Old Material.—Wrought iron and steel grades are accumulating on local yards, but dealers will not grant concessions. Light cast has been the best seller and all available supplies have been taken. Prices asked by dealers, per gross ton, f.o.b. yards, are as follows:

Wrought-iron car axles	$15.00 to $16.00
Old steel axles	13.50 to 14.50
Old iron rails	13.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00
No. 1 country wrought	8.50 to 9.00
No. 2 country wrought	8.00 to 8.50
No. 1 machinery	9.00 to 9.50
No. 1 steel	10.00 to 10.50
Tram car wheels	10.00 to 10.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	7.00 to 7.00

St. Louis

ST. LOUIS, MO., August 12, 1912.

Activity in this market continues unabated, and the general feeling is of confidence in its continuance as well as of ultimately higher prices. At the present moment the smaller buyer is holding the center of the stage, but the big purchaser is not entirely out of it. The situation, too, has settled down to recognition of the fact that deliveries will have to be taken as given and consumers are accustoming themselves to this state of affairs. Collections continue good.

Pig Iron.—While the small buyer has been very numerous in the market the past week and has taken a large tonnage in the aggregate, there has also been decided activity among the larger consumers. There has been an exceptionally large number of purchases of the 100 to 300-ton type and there has been no questioning of the prices, which are very firm. The large business of the past week includes the closing of contracts by an important interest with plants here and elsewhere, aggregating about 35,000 tons of various grades. Inquiries now in the market include one for 5000 tons on an analysis basis which would permit of its being filled by either Northern or Southern makers. There is also an inquiry out for about 10,000 tons of malleable, while still other inquiries are for 1000 tons, 1500 tons and 2000 tons. Two interesting inquiries are for 300 tons and 500 tons respectively of ferromanganese, both of which seem difficult of filling, according to local reports. Quotations remain unchanged. There is a report that one or two furnaces are willing to book first half business at $12 for No. 2 Southern, Birmingham basis, but it is doubtful if any large quantity would be accepted at this figure.

Finished Iron and Steel.—There has been a very heavy flow of orders from small consumers and of small orders from large consumers, but no large contracts were placed. Buyers generally seem to have accepted the situation as to deliveries and report themselves as trying to accommodate their business to the existing circumstances. In steel rails the only transaction was a sale of 500 tons of standard section to a lumber company. In light rails the business from the coal companies has been fairly good, but little has come from the lumber companies in this division. Track fastenings continue in very active demand and urgent requests for hurrying forward of shipments is the rule.

Coke.—No large new contracts are reported, though quite a number of small ones have been closed. The price is given as $2.50 to $2.75 at oven for best 72-hr. selected Connellsville and Virginia coke for foundry use. For 48-hr. coke the quotations here are $2 to $2.25 at oven. By-product coke is quoted at $5.70 per net ton, with very little to be had, the supply being pretty well sold up for some time to come.

Old Material.—The market is very active and advancing, the steel works and rolling mills being in need of stock. Generally the tone is strong and there is much anticipation of an advance over the figures given herewith. The lists out this week include 1000 tons from the Southern and 300 tons from the Vandalia, closing later in the week. Relaying rails are still much wanted and hard to get. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	$14.50 to $15.00
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft	11.50 to 12.00
Relaying rails, standard section, subject to inspection	23.00 to 23.50
Old car wheels	14.50 to 15.00
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards cut apart	10.50 to 11.00
Per Net Ton.	
Iron fish plates	$12.50 to $13.00
Iron car axles	18.50 to 19.00
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Railway springs	10.00 to 10.50
Locomotive tires, smooth	12.00 to 12.50
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	6.75 to 7.25
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	11.00 to 11.50
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	9.00 to 9.50
Machine shop turnings	7.50 to 8.00

San Francisco

SAN FRANCISCO, CAL., August 6, 1912.

Specifications on all finished products have increased somewhat in the last fortnight, the tonnage being almost as heavy as in the latter part of June. Notwithstanding the large orders placed at that time stocks in merchants' hands are not larger than the situation requires and some difficulty is experienced in keeping assortments complete. The jobbing movement is fully maintained, with prices closely following those in primary markets and merchants are confident of activity for the remainder of the year. In view of slow deliveries heavy buying will be necessary the next few weeks to provide for the usual acceleration of the small trade in early fall. The matter of delivery has become a more important consideration than price in several lines.

Bars.—The jobbing movement of soft steel bars is extremely active, and while stocks are fairly large some buyers are endeavoring to get early delivery. Merchants and large consumers are specifying heavily in anticipation of fall requirements, which are estimated on a much more liberal basis than was expected. The heaviest demand, however, is for reinforcing steel, much of which is needed for immediate construction. The output of coast mills is well taken up, and while the largest requirements are provided for, many small buyers are anxious for early delivery. Following the Eastern advance local merchants have raised prices on soft steel bars, which are now quoted at 2.40c., with iron bars at 2.30c.

Structural Material.—All coast cities except Seattle show a marked increase in building for July, Los Angeles making a new high record, while San Francisco shows a gain of about $300,000 over the same month last year. The tonnage of steel now being called for in both cities is fairly large, but few single fabricating contracts are worth mentioning. Figures are in on the St. Francis Hotel addition, but no contract has been announced yet, and a few good sized jobs are being figured at Los Angeles. Specifications for the local city hall may not be ready for some time, and nothing has been done toward getting plans for other civic center buildings. The number of small jobs up for figures is still increasing, and local fabricators are assured of a good tonnage in the fall. The Central Iron Works has a contract for about 120 tons for the Mitchell hotel on Sixth street, and the Schrader Iron Works has the contract for structural and other steel work on the McElroy building. Shreve & Co. have let the general contract for a large factory building to Mahoney Bros. Plans have been approved for two Class A wings for the State ferry building, bids to be called for this month.

Rails.—Sales of light rails, except through a few firms handling industrial track equipment, are limited. The tendency of loggers is to use fairly heavy sections and they have not been large buyers this season, while very little buying is done by mines at present. The general demand for standard sections, however, keeps

up unusually well. Many small roads are pretty steadily in the market, and some new projects are taking tangible form. Many buyers are trying to get quick delivery of rails as well as general track supplies.

Sheets.—The distributive trade in black and galvanized sheets is exceptionally heavy for this season, owing partly to increased building activity, and merchants' specifications are fully as large as at any time this year. Slow deliveries are causing some embarrassment, only one firm having a large quantity in store beyond current needs. Owing to extensive highway improvements manufacturers of corrugated culvert pipe anticipate a heavy demand for the next year.

Plates.—The jobbing movement is fully holding its own, and there is some inquiry for large tank construction, though nothing of special importance has come out this month. The tonnage of marine plates on scattered orders is somewhat larger than usual. It is reported that the Indian Oil Company will put up some large tanks at Eugene, Ore., and at several other points in that state.

Merchant Pipe.—While no large line pipe business has come out the heaviest demand at present is for lap weld pipe, mainly for general oil field use. Merchants, however, report an extremely heavy volume of small business and are buying in sufficient quantities to avoid any possible shortage.

Cast Iron Pipe.—The tonnage on small orders is increasing a little and a few larger inquiries are coming out, though the movement so far has not been fully up to expectations. The largest orders in prospect are from Weiser, Idaho, to come out this week, and Oxnard, Cal., to be let late in the month. The Central California Gas Company has bought the Home Gas Company, Porterville, Cal., and is preparing to serve a number of towns in that district.

Pig Iron.—The local market is still quiet, but melters are showing a little more interest. Some foreign iron is being sold to arrive and sales of Southern iron aggregating several hundred tons have been made in the last few days. Current requirements are only moderate, however, and the outlook is still rather uncertain. No. 2 Southern iron is quoted, f.o.b. San Francisco at $22.08, while English and Continental iron is offered to arrive at about $22.50 to $23.

Old Material.—The demand for most lines of scrap shows some improvement. Cast iron scrap is stronger than for some time, with diminishing offerings, though it is impossible to get any quotable advance. Accumulations of steel melting scrap have been considerably reduced and are firmly held, while some fair sales of wrought scrap are reported. Most of the old Geary street rails will probably be shipped out of the state for relaying. Prices are quoted as follows: Cast iron scrap, per net ton, $14; steel melting scrap, per gross ton, $11.50; wrought scrap, per net ton, $12 to $15; rerolling rails, per net ton, $11.

George P. Alexander has withdrawn from the Alexander Pipe Company and established offices at 320 Market street, this city, under the name of George P. Alexander & Co., handling new and second hand pipe of all descriptions. He will shortly establish a shop and warehouse in Oakland.

P. H. Silberman of the San Francisco Iron & Metal Company is now president of the Alexander Pipe Company, with shop and yard at Seventh and Howard streets. This company cleans and dips old pipe, boiler tubes, etc., for which there is a large demand in connection with irrigation.

Buffalo

BUFFALO, N. Y., August 13, 1912.

Pig Iron.—Sales in the Buffalo district in the past week have reached 75,000 tons, and possibly nearly 100,000 tons of all grades, including a considerable tonnage of malleable. The sales were for shipment over the remainder of the year with some tonnage running into the first quarter of 1913. The inquiry has been correspondingly as heavy, and a large tonnage is still under negotiation. Quite a proportion of the inquiry now received is for 1913 deliveries. Notwithstanding the heavy business that has been booked the market has been attended with no suggestion of excitement, the purchasing being done in a very quiet manner. With some furnaces the condition is revealed that they are just about sold up to the end of the year and will only consider the full market price for the small quantity which they can still supply. It is decidedly a seller's market; but in the placing of business the buyers seem to be studying the situation thoroughly as to the supplying of their needs in pig iron and placing their orders where they feel they will not be disappointed in delivery. The pig iron market at this particular time has a more encouraging outlook than it has had for several years, and it is reasonable to expect that the demand will greatly increase and the price level will be raised by furnaces above that which has now been reached. Prices have firmed materially during the past week and schedules have been advanced at least 25c. per ton. Some furnaces are not quoting less than $14.50 for any grade. We quote the following range, f.o.b. Buffalo, for delivery over the last half of the year:

No. 1 foundry	$14.50 to $15.00
No. 2 X foundry	14.25 to 14.75
No. 2 plain	14.25
No. 3 foundry	14.00 to 14.25
Gray forge	13.75 to 14.00
Malleable	15.00
Basic	14.50 to 15.25
Charcoal, according to brand and analysis	16.00 to 17.50

Finished Iron and Steel.—Mills are rapidly becoming filled with business to capacity to the end of the year in all lines of finished products and one or two interests state that their mills are completely filled for that period and that they are practically declining to accept new business, as they are not yet ready to make contracts for 1913 deliveries. Other mill interests are only accepting business considered most desirable and most easily gotten out, or to fill pressing needs of regular customers. Agencies are becoming careful in the acceptance of orders to see that they do not oversell capacity. Prices are held stiffly at recent advances. The crowded condition of mills and consequent slowness in deliveries are causing a larger demand for warehouse material, even at the further advance in prices now being asked by warehousemen. A large amount of business in wire products is reported for the week. Fabricated deliveries are becoming more and more extended and it is now difficult to obtain promises for delivery before the first of the year. Prices are stiffening perceptibly and premiums are offered for quick deliveries; but under their present sold-up condition mills cannot furnish plain material under three months. This affects the placing of contracts to some extent, as sellers are not seeking orders; but a large amount of new business continues to come out. Bids are being taken for the steel for a machine shop for the Ingersoll-Rand Company at Painted Post, N. Y., 300 tons, and bids for the new State Normal School building at Buffalo, requiring about 500 tons, are to be received August 17. Architects Green & Wicks, Buffalo, are preparing revised plans for the Lackawanna Savings & Trust Company's bank building at Scranton, Pa., requiring 500 tons, and new bids will soon be received. The Lackawanna Bridge Company, Buffalo, has received contract from the Pennsylvania General Electric Company for an additional factory building at Erie, Pa., taking 300 tons, and the C. E. Ernst Sons Iron Works, Buffalo, has received contract for steel for the Strand Theatre, Buffalo, 200 tons.

Old Material.—The market shows continued improvement, both as regards local and outside demand, but transactions have not been heavy. Dealers believe that indications point to larger business in the near future and are holding prices stiffly, although there has been no upward movement from prices current for the past two weeks. We quote last week's schedule without change, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.75 to $13.25
Low phosphorus steel	15.75 to 16.25
No. 1 railroad wrought	13.50 to 14.00
No. 1 railroad and machinery cast scrap	13.00 to 13.75
Old steel axles	15.00 to 16.25
Old iron axles	21.00 to 21.50
Old car wheels	12.75 to 13.50
Railroad wrought	11.50 to 12.25
Boiler plate sheared	13.75 to 14.25
Locomotive grate bars	11.00 to 11.25
Wrought pipe	9.50 to 10.00
Tank iron	10.00 to 10.25
Wrought iron and soft steel turnings	8.25 to 8.75
Clean cast borings	7.50 to 8.00

German Trade Still Satisfactory

BERLIN, August 1, 1912.

That the position of the iron trade continues strong is evident from the further advances in prices reported since a week ago. In the Siegerland region heavy plates have been raised 3 marks to 136 marks and the makers of cold-rolled bands have raised prices 50 pfennigs per metric cwt. On the other hand, Belgium again sends in weaker reports for export, although its home prices are firm. Export prices went off 1 to 2 shillings at Antwerp several days ago for plates of all

classes and for iron bars. Nevertheless, market reviews of Belgian correspondents of the German newspapers describe business as highly satisfactory; shipments of semi-finished steel to England are heavy, and supplies are being further reduced.

The Steel Works Union held its regular monthly meeting at the end of last week and gave out a satisfactory résumé of trade conditions. It is roughly as follows: In semi-finished material the favorable position of the home trade has been fully maintained. Consumers continue to have full work, and in many cases it is not possible to satisfy their urgent calls for delivery of material. Business for the fourth quarter was opened to-day at unchanged prices. In the foreign market, too, employment remains uncommonly good, and new inquiries and specifications on contracts continue to come in at a brisk pace. An agreement has been made with a number of German railroad systems on terms for new orders for heavy steel rails during the next two years. Some of the state roads have sent in their orders for the fiscal year beginning next April, partly in the same proportions as for this year, and partly somewhat smaller; but supplementary orders are looked for. The foreign market for heavy rails continues very good, as indicated by the number of inquiries arriving. Within the past few weeks quite a list of large foreign orders have come under negotiation, and some of these have already been definitely booked. The home and foreign demand for mining rails, both as to new orders and calls for delivery on order, continues the activity of the past few months, so that the works are stipulating long delivery dates, and prices have further stiffened. The demand for grooved rails has grown quieter, corresponding to the season. The mills, however, are fully supplied with work for the rest of the year. The home demand for structural shapes remains satisfactory, and specifications are coming in in greater volume than last year. Reports on the prospects of the autumn trade are not unfavorable, although some complaints are heard as to difficulty in raising money to carry on building operations. Sales of structural shapes at unchanged prices for the December quarter were opened to-day. The favorable position of the foreign market recently mentioned continues; calls for shipment and new orders are alike satisfactory and the foreign trade promises to develop well.

From Longwy it is reported that the Acièries de Longwy is about to make an issue of bonds to add to its plant two open-hearth furnaces of 60 tons capacity each, three converters each of 20 tons, and two converters each of 15 tons. An increase of the dividend for the year just closed is looked for. This company has a working arrangement with the Röchling Eisen und Stahlwerke at Völklingen, near Saarbrücken, whereby the French concern gets its coal and coke from Röchling and reciprocates by supplying ores from its Briey mines.

British Pig Iron Further Advanced

Finished Materials Higher, Notably Plates, Bars and Angles

(By Cable)

MIDDLESBROUGH, ENGLAND, August 14, 1912.

Consumers, realizing the probability of a greater scarcity in pig iron, are buying for forward delivery, at rising prices. Speculators are also entering the warrant market afresh. Pig iron stocks in Connal's stores are 288,594 tons, against 289,176 tons last week. A factor in the advance in pig iron is dearer Rubio ore. Finished material is generally firmer, with advances in some lines, particularly ship plates, in which the total advance this year has been 25s. Bars and angles are up about 5s. There is an increased demand for galvanized sheets. We quote as follows, noting higher prices for plates, sheet bars and pig iron:

Cleveland pig iron warrants (closing Tuesday), 61s. against 59s. 10d. one week ago and 58s. 9d. two weeks ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 61s. 6d., against 60s. 6d. one week ago and 59s. 3d. two weeks ago. Cumberland hematite is 74s to 75s.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £6 2s. 6d.

German 2-in. billets, f.o.b. Antwerp, 100s.

German basic steel bars, f.o.b. Antwerp, £5 15s.

Steel bars, export, f.o.b. Clyde, £7 15s. to £7 17s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7.

Steel ship plates, Scotch, delivered local yard, £8 2s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 2s. 6d.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 7½d., October-December.

Boston

BOSTON, MASS., August 13, 1912.

Old Material.—Business has improved in the week and prices have advanced on some classes of scrap. The quotations given below are of prices offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvanian points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$11.00 to $11.25
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron axles	19.50 to 20.00
Mixed shafting	13.50 to 14.00
No. 1 wrought and soft steel	10.00 to 10.50
Skeleton (bundled)	9.50 to 10.00
Wrought iron pipe	9.25 to 9.75
Cotton ties (bundled)	9.00 to 9.50
No. 2 light	4.50 to 5.00
Wrought turnings	7.50 to 8.00
Cast borings	6.75 to 7.00
Machinery, cast	12.50 to 13.00
Malleable	9.50 to 10.00
Grate bars	7.00 to 7.50
Stove plate	8.50 to 9.00
Cast iron car wheels	12.00 to 12.50

New York

NEW YORK, August 14, 1912.

Pig Iron.—Demand is better in spots. Some selling firms report more inquiry this week than was up one week ago, while in other cases less new business is under consideration. There is more desire on the part of foundries to contract for the first quarter of next year and there are instances in which more iron is being called for to be delivered in the last quarter of this year, indicating that foundry operations are somewhat larger. There has been some fair buying in New England, but in the Metropolitan district nothing is being heard from a number of important consumers who often lead in a buying movement. The inquiry for 2500 to 5000 tons which came from a New Jersey manufacturer of furnace castings last week has been satisfied in part, two or three brands being included in the purchases. Eastern Pennsylvania furnaces still show variations in their prices, but $15.25 at Lehigh Valley furnace is a common quotation. For delivery late in the year $15.50 is asked. The leading Virginia interest has advanced its quotation to $13.75 at furnace for No. 2 X, last quarter delivery. Buffalo prices show some variations. Large business has been done at $14 for No. 2 X foundry, though $14.25 is the basis of ordinary lots, and a few small sales may have been made at $14.50 at Buffalo furnace. In the Lehigh Valley an additional Crane furnace is blowing in this week, and one Hellertown stack is expected to go in on basic iron. Another Virginia furnace is about to blow in. We quote as follows for Northern iron at tidewater: No. 1 foundry, $16 to $16.25; No. 2 X, $15.75 to $16; No. 2 plain, $15.25 to $15.50. Southern iron is quoted at $16.25 for No. 1 foundry and $15.75 to $16 for No. 2.

Finished Iron and Steel.—Immediately, new building contracts in the local market are few and the amount of work before the trade in the shape of buildings is somewhat less than in recent weeks. The Brooklyn Rapid Transit work, which involves 90,000 tons of fabricated steel for subway and elevated construction, is of special interest this week, as bids go in August 15. Some details are yet to be settled, however, in the contract between the company and the city. The company reserves the option of taking 50,000 tons more of steel within a year, and the deliveries on the entire contract are to extend over four years. It is expected that upward of 40,000 tons will be wanted in the coming year for the work that will be done by the Brooklyn company and the Interborough company in subways and in elevated extensions. The new building on the Equitable site, 120 Broadway, has taken shape in the past week, a new corporation having acquired the entire block bounded by Broadway, Pine, Nassau and Cedar streets. A 36-story building will be put up, the steel requirements for which will probably be larger than those for the Wool-

worth Bldg. Bids have gone in on three bridges for the Boston & Maine, about 2000 tons, and bids are being received this week on the office building of W. R. Grace & Co. near Hanover Square. Some additional buying of plates and shapes by car companies is looked for, in view of the steel car contracts recently taken and the considerable number still pending. The plate market is fairly active, a good deal of repair work being under way at shipyards in this district. Less is heard this week of export business in plates. It is believed that little, if any, of the round lot inquired for by a Scotch shipyard some weeks ago will come to this country. Eastern plate mills have been able to make deliveries within a week on some business recently offered and premiums of $2 to $4 a ton are being paid. On the whole, local plate business has been increasing. Eastern mills have had a good business in bar iron, orders coming in in some cases rather more rapidly than the manufacturers have cared to see. Railroad companies have been even more urgent about placing orders for railroad spikes, but it is difficult to find any makers in position to promise anything like reasonably early delivery. New steel bar contracts of any considerable size are not expected, as manufacturing buyers as well as jobbers are covered, but the run of "current orders" for early delivery has been good. The volume of business in bolts and nuts is excellent. Quotations are as follows: Steel bars, 1.46c.; plain structural material and plates, 1.51c.; bar iron, 1.37½c. to 1.42½c., all New York. Plain material from store, 1.90c. to 2.05c.

Cast-Iron Pipe.—The city of Lowell, Mass., opened bids on Tuesday for 700 tons. Medford, Mass., will open bids today for 160 tons, and Taunton, Mass., tomorrow for 400 tons. These are the only public lettings of any importance which have recently come up. Private buying maintains its steady volume, with the demand as heretofore almost exclusively for small sizes, such as 4 to 6 in. Prices of carload lots of 6 in. continue at $22 to $23 per net ton, tidewater.

Old Material.—Although no transactions involving large quantities are reported, a good demand is being experienced for all kinds of old material except cast scrap. The foundries appear to be doing very little buying. The railroad lists for this month have all gone at slightly higher prices than last month. Dealers' quotations, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting	$11.25 to $11.75
Heavy melting steel scrap	11.25 to 11.75
Relaying rails	20.50 to 21.00
Rerolling rails (nominal)	13.00 to 13.50
Iron car axles	20.50 to 21.00
Old steel car axles	15.50 to 15.75
No. 1 railroad wrought	13.75 to 14.25
Wrought-iron track scrap	12.25 to 12.75
No. 1 yard wrought, long	12.00 to 12.50
No. 1 yard wrought, short	11.00 to 11.50
Light iron	5.00 to 5.25
Cast borings	7.00 to 7.25
Wrought turnings	8.50 to 8.75
Wrought pipe	10.50 to 10.75
Old car wheels	13.00 to 13.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.25 to 8.50
Locomotive grate bars	8.50 to 8.75
Malleable cast	10.00 to 10.50

Metal Market

NEW YORK, August 14, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Aug.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
8	17.75	17.62½	45.25	4.50	4.35	7.20	7.05
9	17.75	17.55	45.30	4.50	4.35	7.20	7.05
10	17.75	17.50	.....	4.50	4.35	7.20	7.05
12	17.75	17.60	45.70	4.50	4.35	7.20	7.05
13	17.75	17.62½	45.65	4.50	4.35	7.20	7.05
14	17.75	17.62½	45.87½	4.50	4.35	7.20	7.05

Copper is firm, although the stock on hand has increased. A feature of the copper situation is that the buying is for nearby positions even as early as late in August. Tin is firm. Lead is very dull but steady, with some business in prospect. Spelter and antimony are unchanged but firm.

New York

Copper.—Buying since the first of the month has been dull and mostly for domestic consumption, but it is believed that consumers will have to come into the market soon. Lake copper is unchanged but strong at 17.75c., cash 30 days. The price of electrolytic copper has fluctuated in the past week, going to 17.50c. August 10. This is credited to the report published elsewhere of the Copper Producers' Association which showed an increase in production for the first time in some months. There was also some resale copper in the market in sufficient quantities to influence the price. These stocks were quickly taken up and the price has resumed its position of last week, which is 17.62½c., delivered. In London to-day the market opened steady with spot copper selling at £78 17s. 6d. and futures at £79. The exports of copper so far this month are reported as 10,510 tons.

Pig Tin.—There was one good day's business this week when there was considerable buying for August and September delivery. Spot tin is not in demand, the buying being confined to futures. In spite of the arrivals of tin, which are fair and mostly from ports outside of England, the supplies are only sufficient to take care of contracts on hand. The market is said to be high for extensive buying. The quotation to-day is 45.87½c. spot. In London tin is very strong in a speculative market. The market opened there to-day with spot tin quoted at £207 15s. and futures at £205 15s. The arrivals reported here so far this month are 2381 tons and 1540 tons are afloat.

Tin Plates.—It is said that practically every tin plate mill in the country is operating at or near capacity. It is now about the middle of the canning season, and the demand from that source alone is taxing the capacities of the mills which are asking 10 to 12 weeks' time in which to make deliveries. The price remains firm at $3.74 for 100-lb. coke plates.

Lead.—The recent reduction in the price of lead by the American Smelting & Refining Company has not developed any extensive buying. There is an inquiry out by the United States Government for 2000 tons and it is rumored that the General Electric Company will soon be in the market for 2000 tons. Aside from this, there is practically no buying. Prices remain unchanged, with lead quoted at 4.50c., New York, and 4.35c., St. Louis.

Spelter.—A further drop has been made in the price of spelter. The market is quiet and without special feature. The brass mills and galvanizing plants are busy and are expected to come into the market soon. The quotations to-day are given as 7.20c., New York, and 7.05c., St. Louis.

Antimony.—The market is dull and prices are unchanged. We quote Cookson's at 8.60c., Hallet's at 7.87½c. and Chinese and Hungarian brands at 7.75c.

Old Metals.—While there is very little doing dealers' selling quotations are nominally without change as follows:

	Cents per lb
Copper, heavy and crucible	16.00 to 16.25
Copper, heavy and wire	15.50 to 15.75
Copper, light and bottoms	14.00 to 14.25
Brass, heavy	10.00 to 10.25
Brass, light	8.25 to 8.50
Heavy machine composition	13.00 to 13.25
Clean brass turnings	9.50 to 9.75
Composition turnings	12.00 to 12.50
Lead, heavy	4.40
Lead, tea	4.15
Zinc, scrap	5.50

Chicago

AUGUST 13.—A decided firmness characterizes the local metal market, particularly as regards copper. While prices cannot be quoted higher there is very little metal available. Tin and lead have advanced. Lower quotations on specific lots of spelter have appeared, but for the general market last week's prices continue to rule. We quote as follows: Casting copper, 17.50c.; Lake, 17.75c. to 17.87½c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 46.50c.; small lots, 48.50c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.75c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.20c.; Cookson's antimony, 9c., and other grades, 8.50c. in small lots; sheet zinc is $8.75 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 13c.; copper clips, 14c.; red brass, 12c.; yellow brass, 9.25c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 28.50c.; tinfoil, 33c.; block tin pipe, 40c.

St. Louis

AUGUST 12.—The metal market has been quiet, with some easing up in the prices of lead and spelter, the former being quoted to-day at 4.30c. to 4.32½c. and the latter at 6.90c., though both are firm at that figure with no present indication of further reductions. Tin stands at 45.75c. to 46.15c.; Lake copper, 17.85c. to 17.97½c.; electrolytic copper, 17.75c. to 17.87½c.; Cookson's antimony, 8.95c. to 9c. In the Joplin ore market the past week zinc blende slumped as a result of the drop in the spelter market at East St. Louis, and the top price for

choice lots was $62 per ton, with the basis range for 60 per cent. $58 to $59. Calamine continued strong on the $30 basis for 40 per cent., with the top price $37. Lead ore was quiet at $56 to $57. On miscellaneous scrap we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3.50c.; lead, 3c.; tinfoil, 31c.; pewter, 21c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, August 14, 1912.

Prices of securities have been strong under the stimulating influence of exceptionally good crop reports. Some noteworthy advances have occurred in industrial stocks, the most striking of which was the gain of about $7 per share on Westinghouse Electric. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Bald. Loco., com...	57¾- 58	Pressed Steel, pref.....	102⅞
Bald. Loco., pref...	105⅜-105⅞	Railway Spring, com.	35¾- 37¼
Beth. Steel, com....	37⅛- 38⅞	Railway Spring, pref.....	103
Beth. Steel, pref...	70 - 71⅝	Republic, com.....	28 - 28¾
Can, com.....	40⅛- 42	Republic, pref.....	87⅜- 90
Can, pref.....	118¾-120½	Sloss, com.....	57 - 57⅞
Car & Fdry., com...	58⅝- 61	Pipe, com.....	18⅞
Car & Fdry., pref.....	118¼	Pipe, pref.....	58½- 59
Steel Foundries....	34⅛- 35⅜	U. S. Steel, com....	71 - 73⅛
Colorado Fuel	30½- 32⅜	U. S. Steel, pref...	112¼-112⅞
General Electric....	180⅞-183½	Westinghouse Elec..	82 - 89½
Gr. N. Ore Cert....	43½- 44½	Va. I. C. & Coke...	58 - 62½
Int. Harv., com....	123 -125	Chic. Pneu. Tool...	49¾- 50½
Int. Harv., pref....	119¼-119¾	Cambria Steel.....	44⅛- 44½
Int. Pump, com.....	27 - 27⅛	Lake Sup. Corp.....	33 - 33¾
Lackawanna Steel...	45 - 45½	Pa. Steel, pref.....	97
Locomotive, com...	43½- 45¼	Warwick	10½
Locomotive, pref...	109⅛-109¾	Crucible Steel, com.	18¼- 18⅞
Nat. En. & St., com.	16¾- 17½	Crucible Steel, pref.	95½- 97
Pittsburgh St., pref.	103¾-104¼	Harb. Wk. Ref., pref.....	100½
Pressed Steel, com.	36¼- 37¾		

Robert C. Hall, Pittsburgh, is offering $700,000 of the authorized issue of $1,000,000 4½ per cent. first mortgage bonds of the Norwalk Steel Company, guaranteed by the Crucible Steel Company of America, which company controls and operates the Norwalk plant at Norwalk, Ohio, acquired in 1910. The bonds are of $1,000 denomination and are being offered at $650, including interest from July 1, 1912. The Crucible Steel Company has the right to retire the bonds during their life at $800, plus accrued interest. The balance of the issue, $300,000, has already been sold.

Dividends Declared

The Pittsburgh Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable September 1.

The American Smelting & Refining Company, regular quarterly, 1¾ per cent. on the preferred stock, payable September 3, and 1 per cent. on the common stock, payable September 16.

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent. on the preferred stock, payable August 15, and 1½ per cent. on the common stock, payable September 20.

The Pratt & Whitney Company, regular quarterly, 1½ per cent. on the preferred stock, payable August 15.

The American Radiator Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 15, and 2 per cent. on the common stock, payable September 30.

The Inland Steel Company, regular quarterly, 1¾ per cent., payable September 2.

The stockholders of the Youngstown Iron & Steel Company, Youngstown, Ohio, have re-elected directors as follows: L. E. Cochran, John O. Pew, H. W. Heedy, Mason Evans, C. A. Cochran, C. B. Cushwa and G. F. Danielson. The officers elected are: L. E. Cochran, president; John O. Pew, first vice-president; H. W. Heedy, second vice-president; Mason Evans, treasurer; C. A. Cochran, secretary; C. B. Cushwa, general superintendent; G. F. Danielson, superintendent of pressed steel department.

On Monday of this week the Carnegie Steel Company bought from an Eastern mill 1000 tons of open hearth billets for delivery at the Pencoyd, Pa., works of the American Bridge Company, and has an option on 4000 tons more.

The Baldwin Locomotive Works, Philadelphia, has received an order for 25 Mikado locomotives from the Chicago, Burlington & Quincy Railroad, and also for 12 10-wheel passenger locomotives for the Government Railway in Corea.

Personal

Charles Kirchhoff, who has been abroad for the past six months, will arrive in New York next week.

Otis L. Jones, formerly superintendent of the American Refractories Company, Joliet, Ill., has recently organized and is manager of the Illinois Clay Products Company, which is now completing a large fire clay grinding and shipping plant at Oglesby, Ill.

C. A. Carpenter has joined the sales force of the S. K. F. Ball Bearing Company, whose headquarters are at 50 Church street, New York City.

J. Frank Ritter has been appointed acting superintendent of erection of the Pennsylvania Steel Company, Steelton, Pa., succeeding Frederick C. Cohen, resigned.

Monroe Lemon, 731 Fulton Building, Pittsburgh, has been appointed Eastern selling representative of the Carnahan Tin Plate & Sheet Company, Canton, Ohio.

William H. Marsh, formerly superintendent of construction of the Standard Underground Cable Company, Pitsburgh, has been appointed secretary, assistant treasurer and sales manager of the Standard Underground Cable Company of Canada, with headquarters at Hamilton, Ont.

H. M. Reynolds, recently with the Midvale Steel Company, Philadelphia, has been appointed district representative of the International Oxygen Company, 115 Broadway, New York, manufacturer of oxygen, hydrogen and acetylene generators and appliances, and will have his headquarters in Philadelphia.

A. J. Goss, vice-president and general manager of the Killing Molding Machine Company, Davenport, Iowa, has accepted the position of sales manager of the molding machine business of the Davenport Machine & Foundry Company, which recently took over the Killing Molding Machine Company's business in that line.

Obituary

ARTHUR B. SLADE, treasurer Prentiss Tool & Supply Company, New York, died August 9 in a hospital at Newark, N. J., of appendicitis, aged 44 years. He had been with the company 23 years and for a number of years was its secretary. Two years ago he was made treasurer. He was a member of several fraternal organizations. He leaves a widow, a son and two daughters. His home was at Forest Hills, a suburb of Newark.

CHARLES A. HANEY, vice-president and general manager of the Sloan & Chace Mfg. Company, Ltd., Newark, N. J., died August 10, aged 47 years. He had been ill only a day.

The report that the Aluminum Company of America, Pittsburgh, manufacturer of pure aluminum, with works at New Kensington, Pa., Niagara Falls, N. Y., and East St. Louis, Ill., will spend $26,000,000 in the building of a new works at Knoxville, Tenn., is officially denied. The company states that about two years ago it bought some land near Knoxville but at present has no intention of utilizing it for any purpose whatever.

The bulletin of the American Railway Association shows that on August 1 the net surplus of idle freight cars on the railroads of the United States and Canada was 55,510. This compares with 68,922 two weeks before and brings the surplus to the smallest amount reported since March. The above reduction of 13,412 cars between July 18 and August 1 compares with a reduction of 20,984 in the corresponding fortnight of last year.

No. 2 Crane furnace of the Empire Steel & Iron Company, Catasauqua, Pa., will be blown in this week. This stack has a capacity of about 250 tons a day, which together with the output of Crane No. 1, Oxford and Topton furnaces, which are now running, will give the company a total of about 800 tons a day.

Standardizing Carbon Tool Steel

In *The Iron Age* of July 18 was printed a paper contributed by Henry Otto to a meeting of the Railway Tool Foremen at Chicago, on a suggested classification of carbon tool steel according to the carbon content and for the different uses to which the steel is to be put. The publication of the paper has brought a comment from W. A. Bradbury, Toronto, Ont., Canadian representative of the Eagle & Globe Steel Company, Sheffield, England. He calls attention to a classification given in the company's publication, "Hints to Practical Users of Tool Steel," by Arthur Balfour, a system instituted by the late Henry Seebohm, of Seebohm & Dieckstahl, Ltd., about thirty years ago.

The classification of the steel taken from the book mentioned is as follows:

Classification of Tool Steel.

Class by Temper Number	Designation of Temper	Carbon per cent.	Scope of Use	Color for Forging	Color for Hardening	Color for Tempering
1	razor	1.5	Turning and planing tools, drills, razors, etc. Can only be used by a very skilful workman; if at all overheated, is spoiled.	cherry red	cherry red	light straw
2	turning tool	1.25	Most suitable temper for turning, planing and slotting tools, drills and small cutters. Will not weld.	bright cherry red	cherry red	straw
3	drill	1.125	Drills, large turning tools, mill picks, circular cutters, taps, small shear blades, screwing dies, small punches, etc. May be welded with great care.	red	cherry red	dark straw
4	chisel	1.0	Cold chisels, hot sets, shear blades of medium size, large punches, large taps, drills for granite.	full red	cherry red	red brown
5	set	0.875	Hot and cold sets, chisels, minting dies, large shear blades, miners' drills, smiths' tools, swages, flatteners, fullers, etc.	bright red	bright cherry red	light blue
6	die	0.75	Boiler snaps, hammers, stamping or pressing dies, welding purposes, miners' drills, etc. Will weld easily.	full bright red	bright cherry red	dark blue

The steels are classified by temper number and in addition to the carbon content of the steel is mentioned the purpose for which the steel is intended. A table is also given of the maximum color and corresponding temperature to be given the steel for forking purposes and similarly the temperature and color for hardening as well as the color to be observed in tempering. Mr. Bradbury emphasizes also that the bars are labeled with special labels of the same color approximately as that recommended for tempering. For example, steel of temper No. 1, which contains 1½ per cent. carbon, as shown in the accompanying table taken from the book, and which is regarded as suitable for razors, etc., should be tempered to a light straw color and the bars bear a light straw label. Similarly temper No. 6 steel for blacksmith's tools and the like is tempered to blue and the material is labeled with a blue label. Mr. Bradbury expresses the hope that Mr. Otto will be successful in having the carbon standardization idea generally adopted.

International Harvester's Canisteo Mine

Operations at the International Harvester Company's Hawkins mine at Nashwauk, on the Canisteo range, Minnesota, were never more briskly prosecuted than at present. With a force of 175 men the property is being worked night and day. Five steam shovel crews are employed. The concentrating plant erected at a cost of several hundred thousand dollars to treat the sandy ores of the Hawkins deposit is giving excellent satisfaction. It is washing 5000 tons of iron ore a day, a performance which really is better than had been hoped. There has been difficulty in procuring enough cars, notwithstanding which some 125 cars of ore are being forwarded to the Superior docks daily, of which about a quarter is material shipped directly from the pit and which does not require washing. With the arrival of 1000 new cars ordered by the Great Northern, the Hawkins and other mines will be better served.

New Canadian Structural Project

R. W. Knight, contracting engineer of the McClintic-Marshall Construction Company, Pittsburgh, since its organization 12 years ago, and E. O. C. Kuhnel, works manager of the Carnegie, Pa., plant of the company, with Canadian and American interests, have organized a new company to build a steel fabricating plant near Welland, Ontario, Canada, work on which will be started at once. It is believed that this is a very desirable location for such a plant, as a tremendous amount of structural work is going on in Canada at the present time. The new plant is expected to be ready for operation in November and will have an initial capacity of 600 tons of fabricated steel per month. R. B. Titsworth, formerly contracting engineer for the McClintic-Marshall Construction Company at Detroit, Mich., succeeds Mr. Knight at Pittsburgh, and F. U. Kennedy, of the Philadelphia office, succeeds Mr. Titsworth at Detroit. T. L. Cannon of the Rankin, Pa., plant, succeeds Mr. Kuhnel as manager of the Carnegie, Pa., works.

Reliance Rotary Chimney Top.—The Berger Mfg. Company, Canton, Ohio, has recently placed on the market the Reliance patent chimney top. The hood of this device extends below the top of the chimney, encompassing it on three sides. It is especially adapted to chimneys surrounded by a group of buildings. Due to careful machining, the pivot movement of this chimney top insures perfect and instant action. It is stated that the slightest breath of air causes it to revolve. Its construction is such as to insure durability. It is made in seven sizes so as to fit flue diameters of 4 to 12 in.

Combination Tool Holder.—A tool holder has been designed by A. O'Keefe & Sons, 353 Mulberry street, Newark, N. J., which is intended to be universal for straight and angle cutting. The cutting tool is tilted to any desired angle by a set screw, while a nut on the opposite end of the tool clamp holds the swing plate and the tool in position. To accommodate tools made from different sizes of stock, an angle bushing is employed.

The Massillon Rolling Mill Company, Massillon, Ohio, will increase its sheet mill plant by the addition of one hot mill, making 10 in all. The company is also increasing its cold rolled finishing capacity about 100 per cent. to take care of its increased business on automobile and polished sheets for range work.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, has received a contract from the Lackawanna Steel Company, Buffalo, N. Y., for three automatic spike machines. The former company is building an addition to its foundry and will erect a new pattern storage building.

Pittsburgh and Vicinity Business Notes

The Pittsburgh Crucible Steel Company, subsidiary of the Crucible Steel Company of America, Pittsburgh, is making rapid progress on the building of its new open hearth steel plant at Midland, near Beaver, Pa. The steel frame work for the building to house the open-hearth furnaces is about finished, and the foundations for eight 60-ton open-hearth furnaces are about ready. A 40-in. blooming mill will be installed by the United Engineering & Foundry Company, and it is also the intention to add a number of finishing mills, but the exact nature of these have not as yet been determined. The plant will have a daily capacity of close to 1000 tons of steel ingots.

The Shenango Furnace Company, Sharpsville, Pa., is relining its No. 4 furnace and is installing new blowing equipment.

The Washington Tin Plate Company, Washington, Pa., has increased its indebtedness from $192,000 to $400,000.

At Pittsburgh last week Van Horne Ely was appointed receiver of the Great Lakes Coal Company, following the filing of a bill in equity against the company by George S. Goodwin, a creditor and stockholder. The company has a capital stock of $5,000,000, with offices in the Fulton Building, Pittsburgh. It is credited with owning 22,000 acres of coal lands in Armstrong and Butler counties, Pa., and has four mines fully equipped.

The 1000 low side gondola cars to be built by the Pressed Steel Car Company, Pittsburgh, for the Pittsburgh & Lake Erie Railroad will embody some special features of construction. They will be 46 ft. long, being designed for carrying long lengths of steel products, such as structural shapes, plates, pipe, etc.

It now seems probable that the plans of Edwin N. Ohl, W. H. Schoen and others of Pittsburgh to purchase the plant of the New Castle Forge & Bolt Company at New Castle, Pa., and convert it into a works for the manufacture of steel cars and accessories, will not be carried out. They obtained a charter for a company to be known as the New Castle Steel & Iron Company, but the purchase was contingent upon certain arrangements being made with the railroads entering the town, which were not granted. It is likely, therefore, that the new company will not take over the plant but that the charter may be used in some other proposition, either in New Castle or in another location.

The report that Alice furnace of the Valley Mold & Iron Company, Sharpsville, Pa., will be shortly blown in is incorrect. The company has not yet set any definite time for starting the furnace.

The firm of Adams & Rademacher has been organized to deal in carbonless metals and metal alloys, with offices in the Commonwealth Building, Pittsburgh. Mr. Rademacher was formerly connected with the firm of Bayley & Rademacher, Philadelphia.

The Isabella-Connellsville Coke Company is building 24 beehive coke ovens and 136 rectangular ovens at Brownsville, Pa. Regan & Lynch, Uniontown, Pa., have the contract for the ovens, the Harbison-Walker Refractories Company, Pittsburgh, will supply the fire brick, and the Connellsville Mfg. & Mine Supply Company, Connellsville, Pa., will furnish the machinery for operating the ovens. A contract for the installation of an electrically operated larry is yet to be placed.

Some time ago it was announced that the recently organized Pittsburgh Sheet & Tin Plate Company would build a tin plate plant at Morgantown, W. Va. The plans were made by the Schlieper-Daae Engineering Company, Pittsburgh, but it now develops that the plant may not be erected at Morgantown, as negotiations have been opened with boards of trade at Greensburg, Tarentum and Butler, Pa., with a view of locating at one of these places. No definite site has yet been selected.

The Pittsburgh Steel Company, Pittsburgh, is installing an 8-in. and a 12-in. bar mill in its plant at Monessen, Pa., which will be ready for operation in the fall.

The Mesta Machine Company, Pittsburgh, works at West Homestead, Pa., has received an order from the Shenango Furnace Company, Sharpsville, Pa., for two Mesta high-speed type 44 and 84 and 84-in. blowing engines, equipped with the new Mesta patented automatic air valve. The engines will develop a speed of 80 r.p.m. with a blast of 30 lb. The same company has received an order for a Helander barometric condenser for shipment to the Homestead works of the Carnegie Steel Company and for another of the same type for its Mingo Junction works, also an order for two large ones for the Pittsburgh Crucible Steel Company at Midland, Pa. The iron and steel roll foundries of the Mesta Machine Company are now being operated to practically full capacity.

The Braddock Machine & Mfg. Company, Braddock, Pa., builder of rolling mill and steel works equipment of all kinds, has received an order from the Pittsburgh Crucible Steel Company for 62 ingot mold cars and three dummy cars for delivery to its new works at Midland, Pa., and has also received an order from the Republic Chemical Company, New York City, for the erection and installation of seven 65-ft. drying cylinders at its new plant to be built on Neville Island, near Pittsburgh, the time specified for completion of this work being three months.

The Blaw Steel Centering Company, Westinghouse Building, Pittsburgh, announces that its name has been changed to the Blaw Steel Construction Company. The new name is descriptive of the work which will be done by the company as soon as its new plant is completed. It will take contracts to fabricate practically every type of steel construction, but the manufacture of Blaw steel frames is and will be one of its principal lines.

The fifth annual reunion of the employees of the Mesta Machine Company will be held in Homestead Park, Homestead, Pa., August 16.

The business entered by the Westinghouse Machine Company, Pittsburgh, in August is expected to be larger than in any similar month in its history. The condenser business, which is a department of a somewhat recent addition, has shown remarkable activity of late and quite a large number of important orders have been booked in that line. Notable among these is a contract from the Brooklyn Edison Company, which calls for steam condensers of an unusual and large type. They are to be used in connection with the Curtis steam turbines of 10,000 hp. The company has also received a contract for a 7500 hp. Westinghouse steam turbine from the Rio de Janeiro Electric Railway, Light & Power Company. In addition, the shops are now completing some work for the Government in connection with the Panama Canal that has taken a year to finish. This includes lock gates along the canal and auxiliary steam apparatus.

The Valley Machine Company has been organized at Parkersburg, W. Va., with a capital stock of $150,000 The incorporators are B. B. Putnam, Dayton, Ohio, and Ferguson O'Connor, R. G. Stiles and John Marshall, Parkersburg.

The American Sheet & Tin Plate Company has added two 35-ton open hearth furnaces to its plant at Vandergrift, Pa., making a total of 12 at the works.

A serious accident occurred last week at No. 4 furnace of the Jones & Laughlin Steel Company, and which will delay starting the furnace for a week or so. An electric bolt struck a high tension wire which furnishes current to the pumping house and temporarily disabled the pumping engines. One man was killed and three were seriously injured.

Round Hoops for Water Tanks.—A committee report to the American Railway Bridge and Building Association, as summarized by the Engineering Record, advocates round iron hoops for wooden water tanks in preference to flat hoops. It is stated that wrought iron, which is considered the best material for this purpose, is more easily obtained in rounds than in flats. One argument in favor of the round hoop is that fully 90 per cent. of its surface is exposed to view, hence deterioration is more easily discovered and painting is more effective. Objections to the use of the round hoop are raised on account of its small bearing surface against the staves, and the ledge offered by the upper surface for the accumulation of dirt and moisture. The report states that experience has shown that if properly placed the small bearing surface does not induce crushing of the fiber, and suggests the caulking of the round hoops with oakum and filling the top space with roof cement to obviate the second objection.

The Foundry Industry

A Decline in Number of Plants in the United States Since April, 1910

Statistics compiled by the Foundry show that on July 1, 1912, there were in the United States and Canada 6538 plants engaged in the manufacture of gray iron, steel, malleable, brass and aluminum castings (5996 of these being in the United States and 542 in Canada). This number compares with 6594 foundries on April 1, 1910, showing a net loss in two years and three months of 56 foundries. In the two years preceding April 1, 1910, the increase was 228. This increase in two years of depression was due to the fact that a number of new shops were under erection when the panic of 1907 came and these and others were completed in 1908 and 1909. It is stated that 495 new companies built foundries between April 1, 1910, and July 1, 1912, and of this number about 100 had ceased operation on July 1 of this year. In the period covered by the latest compilation a total of 405 plants discontinued operations and 333 foundries were absorbed by other companies. In the past two years a good many foundries have increased their capacity so that the net loss of 56 in number of plants, as shown by the last statistics, does not mean that existing capacity is less than that of two years ago. The number of foundries in the leading cities of the United States this year and in 1910 appears in the following table:

	1912.	1910.
Chicago	169	174
New York City	128	148
Philadelphia	119	122
Pittsburgh	109	93
Detroit	98	93
Cleveland	91	92
Cincinnati	74	76
Milwaukee	69	67
Buffalo	66	61

The distribution into the various classes of foundries in the United States is as follows:

	1912.	1910.
Gray iron	4475	4680
Malleable	175	168
Steel	299	248
Exclusively brass	3389	3375
Brass departments	2178	2205
Foundries melting aluminum	1881	1569

The number of gray iron foundries in Canada on July 1, this year, was 468, of malleable foundries 15, of steel foundries 19, and of brass foundries 291, while there were 138 Canadian foundries which melted aluminum.

The Southwestern Steel Corporation

Further developments in the formation of the Southwestern Steel Corporation, of which E. F. Goltra of St. Louis is to be head, include the purchase of 400 acres at a cost of $300,000 at Penn City, which is eight miles below Harrisburg on the Houston ship canal, Texas. It is stated that the project contemplates the investment of more than $5,000,000 in the plant at Penn City, whose name is to be changed to Steel City, and about the same amount in ore lands in eastern Texas, which it is stated are already under option. George M. McIlheiny, New York, is the active promoter and the Houston Trust Company is acting as trustee in the deal. A subsidiary corporation which is being formed is the Southwestern Steel Development Corporation, which includes John H. Kirby, J. M. West, the Dickson Car Wheel Company, S. F. Carter, A. S. Vandervoort and James F. Sadler, who are also concerned in the primary company. Blast furnaces will be about the first to figure in the construction work. The new company controls a frontage of three miles on the ship canal, running to a depth at some points of two miles.

The C. C. Knight Company, Sixteenth and Callowhill streets, Philadelphia, Pa., iron and steel merchant, desires catalogues and extra lists from manufacturers of various finished iron and steel products, including iron and steel bars, forgings, plates and shapes, shafting, boiler tubes and pipe, rivets, bolts, nuts and washers, corrugated and galvanized sheets and concrete bars.

The Trumbull Steel Company, organized recently with Jonathan Warner as president to build a tin plate plant at Warren, Ohio, has increased its capital stock from $1,000,000 to $1,250,000.

The Steel Corporation's Mine Rescue Engineer

A recently established United States Steel Corporation office is that of mine rescue engineer. The position is held by Charles H. Hawes, lately engaged in similar work for the United States Government. The corporation has within the last two years expended large sums in the installation of safety devices in its mines and shops, taking every precaution to guard its employees against accidents, and more recently it has had established mine rescue stations in various central fields, these stations being equipped with oxygen helmets, resuscitating machines, fire extinguishers and other apparatus of possible necessity in time of emergency. The rescue engineer will have direct supervision of the safety department and in that connection will act as instructor of the rescue crews organized at the different mines. A similar policy has been adopted by the Cleveland-Cliffs Iron Company, which has also instituted a school of instruction for its miners at which the men are prepared for more responsible positions in the company's service, the curriculum embracing courses in the various departments of mining work.

The Girod Electric Furnace at Bethlehem.—C. W. Leavitt & Co., 30 Church street, New York, representatives of the Girod electric furnace in this country, announce that the Bethlehem Steel Company, South Bethlehem, Pa., has decided to install this furnace, which will enable a much larger quantity of special steel to be produced. The company manufactures tool steel and other products of high grade steel, as well as armor plate, structural shapes and rails. Leavitt & Co. state that the Girod furnace has given unusually good results in the manufacture of large heats of the better grade of steel, and among prominent European manufacturers using this furnace is the Fried. Krupp Atkien Gesellschaft, Essen, Germany. The first Girod furnace to be installed by the Bethlehem Steel Company will have a melting capacity of 10 tons per heat.

The first annual outing of the Oakley Superintendents and Foremen's Club was held August 11, and was largely attended. In the afternoon a chicken dinner was served at Weber's Restaurant, the principal speakers at which were J. M. Manley, on "Organization and Its Benefits," and H. M. Ramp, superintendent Modern Foundry Company, whose subject was "What Are We Doing?" The Entertainment Committee consisted of Fred Weissman, H. M. Roberts, Charles Moon, C. Meriden, Wm. Reader, Jr., C. Mitchell, F. VanArman and J. Perrien. Oakley is a suburb of Cincinnati.

The condition of the steel casting industry in Chester, Pa., is now close to high-water mark. Practically all the steel casting plants are operating nearly full capacity, being handicapped to some extent by the scarcity of labor, which has in instances interfered with deliveries. There has been a general advance in the price of castings, and practically all the companies look forward to continued activity for the remainder of the year.

The New Haven Branch, National Metal Trades Association, had a shore dinner at Lighthouse Point, Conn., August 6, with National Commissioner Robert Wuest as its guest. The attendance was large. President Harry B. Kennedy, Hoggson & Pettis Mfg. Company, was in the chair. The speakers were Commissioner Wuest, President F. C. Blanchard of the Manufacturers' Association of Bridgeport, and Dr. Winthrop Talbot of Human Engineering.

The Davenport Machine & Foundry Company, Davenport, Iowa, has recently taken over the molding machine business of the Killing Molding Machine Company. The Davenport Machine & Foundry Company is one of the oldest and largest concerns in its line of Chicago, and is especially well equipped for continuing this well-known line of molding machines, its facilities being such as to enable prompt deliveries.

The Thomas Iron Company, Easton, Pa., is preparing the No. 11 furnace at Hellertown, Pa., for operation and it will be blown in in about two weeks.

The Republic Iron & Steel Company

Annual Report, Fiscal Year Ended June 30, 1912

The Republic Iron & Steel Company has issued its thirteenth annual report, giving the result of operations in the fiscal year ended June 30, 1912. The income account is as follows, compared with the showing for the previous year:

Income Account and Statement of Surplus

	1911-12.	1910-11.
Net earnings from operations	*$2,384,851.67	†$3,758,698.20
Interest and dividends received, less interest paid	99,565.57	86,302.12
Total profits for the year	$2,484,417.24	$3,845,000.32
Less provision for depreciation and renewal of plants	268,440.20	600,254.56
Provision for exhaustion of minerals	213,730.72	235,811.34
Net profits for the year	$2,002,246.32	$3,008,934.42
Deduct:		
Interest on bonds	728,983.85	586,414.79
Dividend paid on preferred stock	875,000.00	1,750,000.00
Surplus for the year	$398,262.47	$672,519.63
Add surplus at July 1, each year	5,362,445.85	4,954,660.54
Total	$5,760,708.32	$5,627,180.17
Deduct:		
Discount and expense in connection with the new issue of mortgage bonds	170,817.11	264,734.32
Amount specially appropriated for depreciation	250,000.00	.....
Net surplus carried to balance sheet	$5,339,891.21	$5,362,445.85
Net profits applicable to dividends	1,273,262.47	2,422,519.63

*After deducting charges for maintenance and repairs of plants amounting to $1,634,145.84.
†After deducting charges for maintenance and repairs of plants amounting to $1,313,162.25.

General Remarks

The fiscal year covers a period of lowest market prices ever experienced in the history of the company. General business conditions were most unsettled, the cost of labor was high and general operating conditions were of an adverse character.

The general weakness and demoralized condition of the iron and steel market referred to in the semi-annual report of December 31, 1911, was decidedly intensified by the introduction of new factors of business disturbance which had the effect of causing a further loss of business confidence. Under these conditions, producers of iron and steel, in order to stimulate an economic volume of business, offered further price reductions, low ebb in values being reached during March. Under the influence of bargain prices and improvements in business sentiment, due in part to lessened activity of investigating committees and also to improved crop prospects, the volume of business was rapidly increased, reaching such proportions during April that general price advances were stimulated.

The various new manufacturing departments put in operation during the past year have all been successfully organized and efficient results secured, with profits realized from capital investment in new improvements, equal to, and in some instances larger than, those secured from the older and better established departments. A study of the report in detail will emphasize the fact that not only maximum production has been realized, but that high efficiency has been obtained. Production is now the greatest and costs are the lowest in the company's history, all previous records having been exceeded.

In view of the large expenditures for maintenance and repairs (disbursement on this account exceeding the previous year's allowance by $320,983.59), and owing to the liberal allowances heretofore made for depreciation and also in consideration of the many new additions to plant, it was deemed proper by the Executive Committee to make some reduction in depreciation charges for the current year; full allowance, however, has been made by deduction from earnings for the maintenance of all other provisional funds.

Gross Volume of Business

The gross volume of business expressed in tons shows an increase as against the record year 1907 of 27.5 per cent., but owing to the demoralized condition of the iron and steel market, and the consequent extremely low prices realized from sales, the total value of shipments is 7.6 per cent. less than for the year 1907, but shows an increase as against the year 1910 of 20.1 per cent. and of tonnage, 43 per cent.

Year ended June 30, 1910	$28,296,265.97
Year ended June 30, 1911	24,071,771.32
Year ended June 30, 1912	28,983,055.54

The balance sheet as of June 30, 1912, is as follows:

Balance Sheet

Assets.

Cost of properties July 1, 1911		$64,151,272.82
Additions for the year ending June 30, 1912		1,536,729.29
Investments in Potter Ore Company	$401,000.00	
Investments in other companies	559,984.02	
		960,984.02
Total capital assets		$66,648,986.13
Cash deposited with trustee for redemption of first mortgage bonds in addition to bonds of a par value of $2,216,000 retired in terms of the trust deed, per contra		218,300.02
Inventory of manufactured products, material and supplies on hand at or below cost	$6,646,447.69	
Ore contract payments represented by ore at docks	704,383.23	
Accounts and bills receivable after deducting reserve for bad and doubtful accounts	5,233,653.65	
Cash	2,717,829.80	
Total current assets		15,302,314.37
Deferred charges to operations: Expenditure for stripping at mines, advanced royalties, etc., chargeable to future operations		897,906.15
Total		$83,067,506.67

Liabilities.

Capital stock:		
Common—273,520 shares of $100 each	$27,352,000.00	
Less—In treasury	161,000.00	
		$27,191,000.00
Preferred—250,000 shares of $100 each		25,000,000.00
Total capital stock outstanding		$52,191,000.00
First mortgage bonds:		
Total issue	$10,000,000.00	
Deduct — Deposited with trustee and cancelled	2,216,000.00	
	$7,784,000.00	
Less—Deposited with trustee of the 10-30 sinking fund bonds in exchange for bonds of that issue.	6,206,000.00	
Balance outstanding		1,578,000.00
10-30 sinking fund bonds:		
(Total authorized issue, $25,000,000.00)		
Total issued	$17,000,000.00	
Less—Treasury bonds pledged...$3,583,000.00		
Purchased for sinking fund 684,000.00		
	4,267,000.00	
		12,733,000.00
Potter Ore Company Bonds: $618,000 outstanding first mortgage bonds guaranteed jointly with Tennessee Coal, Iron & Railroad Company, less that company's proportion		309,000.00
Bonds and notes outstanding on the Martin Coke Works property		312,286.80
Collateral notes due November 24, 1913		3,000,000.00
Funds:		
For exhaustion of minerals and mining equipment	$1,608,110.52	
For depreciation and renewal of plants	1,787,234.00	
For relining furnaces	318,564.16	
For fire and accident insurance	407,503.94	
For contingencies	82,504.42	
		4,203,917.34
Dividend warrants, payable in equal annual installments from October 1, 1912, to 1915, inclusive		748,632.00
Accounts payable	$1,789,772.03	
Ore contract balances representing cash received in excess of the value of ore shipped to customers	475,801.52	
Taxes accrued	199,445.67	
Interest accrued	184,014.65	
Unclaimed dividends	2,745.75	
Total current liabilities		2,651,779.62
Surplus: Balance June 30, 1912		5,339,891.21
Total		$83,067,506.67

General Operations

As suggesting the growth and development of the company's mining and manufacturing operations during the period of the past seven years, the following figures of production are submitted:

	1912. Tons.	1905. Tons.	Per cent. increase.
Ore	1,722,495	794,167	117
Coke	861,761	256,264	236
Pig iron	1,007,849	442,640	128
Steel ingots	963,488	448,331	115
Finished and semi-finished	979,617	672,012	46

The large increase in production noted has been made while the entire character of the business was being changed from iron to steel, and without interruption to regular operations. The original maximum iron products capacity was approximately 600,000 tons per annum while the actual iron products output for the current year was approximately 120,000 tons.

In support of increased producing capacity and for proper protection to capital invested, the iron ore reserves of the company have been more than doubled, with only nominal increases to capital account, as largely the expense of exploration was charged to operating results, so that the full value of the mineral holdings of the company are not represented in the property accounts.

Comparison of Coal and Mineral Reserves.

	June 30, 1912. Tons.	June 30, 1905. Tons.	Per cent. increase.
Ore:			
North	43,804,037	20,000,000	119
South	88,095,285	49,041,800	80
Total ore	131,899,322	69,041,800	91
Coal, North:			
Coking	22,114,547	13,890,000	59
Steam	16,818,000	12,500,000	35
Total North	38,932,547	26,390,000	48
Coal, South:			
Coking	65,246,833	92,338,800	*29
Steam	15,665,820	81,203,400	*81
Total South	80,912,653	173,542,200	*53
Grand total coal	119,845,200	199,932,200	

*Decrease.

NOTE.—Coal reserves for 1905 were erroneous, being based on acreage estimates without exploration or diamond drilling, thorough subsequent exploration work on which present calculations are based for all minerals, reduced the acreage of workable coal seams and necessarily the tonnage.

Improvements

Recognizing the necessity of keeping step with progress being made in the conservation of waste products and in the improved methods of manufacture, the Executive Committee has authorized the construction of a by-product coke works of 1000 tons daily capacity, the waste gases from which works will be utilized as fuel as a substitute for coal and the recovered tar and ammonia sold on the market. In addition to this improvement there has also been authorized the construction of four modern merchant bar mills consisting of 8-in., 10-in., 12-in. and 20-in. trains; these mills to replace four mills of an obsolete type at the Brown-Bonnell Works, which old mills are now being dismantled.

Summary of Production

	1912. Tons.	1911. Tons.	1910. Tons.
Iron ore	1,722,495	1,861,185	2,050,224
Coke	861,761	723,859	670,018
Limestone	53,064	88,239	115,473
Pig iron	1,007,849	850,863	793,962
Bessemer steel ingots	655,673	597,991	681,884
Open-hearth steel ingots	307,815	6,939	.....
Total steel ingots	963,488	604,930	681,884
Finished and semi-finished products	979,617	684,553	827,515

The manufactured products of the company are as follows: Merchant steel and iron bars, light structural and agricultural shapes, sheared plates, standard and hand spikes, bolts, nuts, turnbuckles, cold drawn bars, tubular products, Bessemer and open-hearth billets and sheet bars and foundry, Bessemer and basic pig iron.

Iron Ore Reserves

Reserves of ore are based on diamond drilling estimates. Increased tonnage indicated is the result of additions to the reserve from exploration work during the year, reductions having been made for the mine output during this period. Comparative figures submitted herewith show the reserves as of June 30, 1912, compared with similar periods for the preceding years, in gross tons:

Year ended.	North.	South.	Total.
June 30, 1910	38,909,693	88,451,383	127,361,076
June 30, 1911	38,812,467	88,658,581	127,471,048
June 30, 1912	43,804,037	88,095,285	131,899,322

Coal and Coke

Expenditures during the year, on account of improvement to coking operations, have been of a minor character, as the development of the by-product type of coke oven, with its demonstrated economies, suggests that it would be ill-advised to extend our beehive oven operations.

In order to economically and quickly develop what is known as our Porter coal territory, South, the management recommended and the Executive Committee approved of the purchase of the Palos Coal & Coke Company's property, consisting of approximately 600 acres of developed coal land, which immediately adjoins the Porter tract. This purchase was made on an extremely favorable basis, and the property acquisition will at once increase our coal production by 600 tons of coal per day, and this output can be quickly increased to 1200 tons, and, furthermore, the Palos Mine entry can be gradually extended into the Porter tract for its development. Comparative figures of coke production are as follows:

Year ended.	Net tons.
June 30, 1910	670,018
June 30, 1911	723,859
June 30, 1912	861,761

New Construction and Property Additions

Additions to the property account during the year aggregated $1,536,729.29. The total new construction to date, June 30, 1912, is:

Northern District.	
Blast furnaces	$4,098,745.44
Bessemer steel plant	3,348,498.48
Open-hearth steel plant	5,448,353.37
Tube works	1,107,026.23
Rolling mills	2,117,846.59
Coke plants	1,095,813.64
Northern mines	1,433,135.10
General office building	176,691.94
Total	$18,826,110.79
Southern District.	
Blast furnaces	$1,816,208.61
Coke ovens at blast furnaces	176,917.54
Tenant houses at blast furnaces	58,991.07
Rolling mills	112,912.67
Mines and coke ovens	1,431,832.85
Limestone quarries	127,070.46
Total	$3,723,933.20
Grand total	$22,550,043.99

Unfilled Orders

The tonnage on hand while slightly below that reported June 30, 1911, has been booked under more stable market conditions, the current volume of business being larger with price tendencies upward. The prospects, therefore, suggest full employment of capacity, with gradual improvement in values. The following comparative figures of unfilled orders are submitted:

Finished and Semi-Finished.	Tons.
June 30, 1910	341,887
June 30, 1911	481,425
June 30, 1912	454,961
Pig Iron.	Tons.
June 30, 1910	82,906
June 30, 1911	102,077
June 30, 1912	96,935

In the totals of finished and semi-finished products nothing is included but fixed contracts; sliding scale contracts with periodical adjustments are excluded.

Huge Reservoir for Western New York.—Richard W. Sherman of Utica, N. Y., chief engineer for the Conservation Commission of New York, is having plans and estimates prepared in the offices of the commission at Albany for a huge reservoir which it is proposed to construct at Linden, Wyoming County, to supply water to a number of cities and villages in western New York, including Batavia, Lockport, Tonawanda and Niagara Falls. The project calls for a concrete dam at Linden to impound the flow of Little Tonawanda Creek and all of the water which falls on an area of 22 square miles in the Dale Valley, in Wyoming County. The reservoir will cover a tract of 1030 acres, from which a number of buildings will have to be removed. The reservoir as proposed will be 60 ft. deep in places and will hold 10,000,000,000 gal. of water—a two years' supply for 100,000 people. Distribution will be by gravity, the main pipe lines being 3 ft. in diameter. Engineers are preparing a map of pipe lines from the reservoir to the various cities and villages which may be supplied.

The Lake Superior Corporation, Sault Ste. Marie, Ont., is again operating at capacity, producing daily 1000 tons of rails, 1400 tons of pig iron, 1500 tons of coke and quantities of minor products, and, according to a representative of the corporation, its present bookings will take it to the first of the year.

Loose-Leaf Engineering Catalogues

An Engineer-Buyer's Suggestions to the Manufacturer Regarding Style and Character of Trade Publications—Indexing Trade Publications

The standard size loose-leaf catalogue as an aid to efficiency in engineering offices is the subject of a paper by John M. Mahon, Jr., member of the Engineers' Society of Pennsylvania, printed in the journal of the society. The paper substantially in full and the discussion are as follows:

Every designer or buyer is quite familiar with the chaotic conditions which arise with the everyday use of a catalogue filing system. In fact, it is almost impossible to evolve any method which may be called a system out of a large and varied collection of trade pamphlets ranging in size from 3 to 18 in. and in thickness from one sheet to 500 pages or more. Such an assortment demands every conceivable sort of filing unit and because of odd shapes and varying weights soon grows, with the best of care, into an unwieldy burden, where data are seldom readily accessible, and from which the catalogues are often removed and not returned to their places.

What Is Sometimes Done to Makers' Literature

Incalculable time is wasted searching through long indexes or turning innumerable pages of exaggerated assertions to find what one wants—condensed, accurate information. Perhaps one tears out the useful pages and throws the trash away, only to find the valuable sheets missing when they are wanted; lost in the files. If advertisers and manufacturers knew what becomes of their artistically printed and bound pamphlets their printing bills would certainly be reduced, and it is probable that their business would not be injured.

If for no other reason, convenience and efficiency demand some change in the sellers' present method of setting forth information for the buyer.

To the engineer, draftsman, owner or official, buyer and superintendent who are engaged in construction work, what could be of greater value than a single volume, or several volumes, easily handled, to which additions or changes could be quickly made and in which reference was facilitated by thumb index to each subject or general group of subjects?

A separate sheet should be devoted to each maker of each article or group of similar articles, presenting facts in such explicit language that professional knowledge would meet trade knowledge on every page. In such a catalogue each sheet would be as valuable to both maker and consumer as an ever-ready salesman, who always says enough, but never too much.

The day of coercive selling is past. The seller who presents his information fully and quickly, but in a dignified manner, will get the order, all other considerations being equal. The seller who depends on exaggerations or specious arguments by agent or catalogue may be left out of consideration, as his need for catalogues will soon cease to exist. The office boy and stenographer may look at his touched up half-tones, but the busy man has no time for them and requires, and should demand, his information in condensed form with all unessentials eliminated.

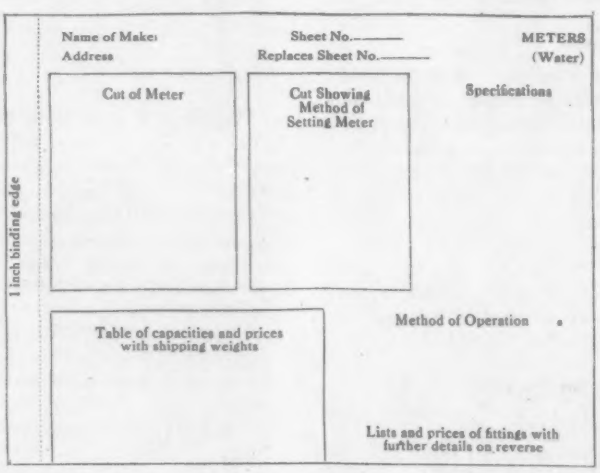
The Character of Catalogue Wanted

All similar products should be in the same section of the book and not scattered through a dozen volumes. To successfully bring together the buyer and seller the designer must be able to specify definitely. To do this intelligently he should have all essential facts about all standard materials used for the same purpose before him at the same time. To accomplish this with individual catalogues would mean the collection of a number of pamphlets, in each of which the information would be scattered over many pages, so that a fair comparison would take endless valuable time.

A complete knowledge of the market, in all lines, is quite impossible for a designer or buyer to acquire, and it is for this reason undesirable to have all articles of every maker catalogued, for some are bound to be inferior and it should be possible to efface absolutely such articles, lest they be specified by mistake. Many catalogues, for the same reason, are not conducive to careful choice and decidedly do not properly present information about new products and processes. The whole market should be available to every buyer, yet it should be possible for him to eliminate poor articles without rejecting every article made by the manufacturer of the poor one.

The Form of Literature Wanted

A series of standard size loose sheets should be published by each manufacturer, a separate sheet being devoted to each article or group of articles of the same kind, but of varying sizes and designs. The method of distribution, whether direct from the maker or through a distributing agency, would be an economic problem which each maker would have to solve for himself. The main point is that by such an arrangement the buyer would receive only such literature as he required and the maker would only pay for the printing, which would be to his particular advantage with each buyer; thus both buyer and seller would be gainers, one in increased convenience of reference and the other in money saved on printing, mailing and so forth.



Suggestion for the Arrangement of an 8½x11-In. Sheet

By such a system the specialist could collect the sheets to which he most frequently refers in a loose leaf binder on his desk, and those less often needed could be filed in folders indexed for each general article, all makes of the same product being placed in the same folder.

As to the size of the sheets, the standard letter head, 8½x11 in., seems to the writer the most natural and convenient one, owing to the fact that it could be more readily enclosed with correspondence in standard size envelopes, correspondence giving additional information or special quotations could be placed with the printed sheet in the binder and seldom used sheets could be filed in the ordinary letter folders.

The accompanying diagram is a suggestion of what might be done along this line. By using such a sheet the producer could replace old sheets in the catalogue of each buyer at the minimum printing and mailing expense, as the old and new sheet numbers would appear on each sheet issued.

The scheme at first sight may seem Utopian, but it is firmly believed to be practicable. Not long since the public looked with doubt on the efficiency expert; to-day his work is a recognized factor in improved producing conditions. The comparison seems not far fetched but wholly obvious and a very broad field is open to the selling economist along these lines.

That a system of this kind is not looked upon with favor by many of the large manufacturers is evidenced by the fact that several unsuccessful attempts have been made along these lines by various associations. The matter, it is stated, has been discussed by the American Society of Mechanical Engineers, but as yet no results have been accomplished. These failures, no doubt, rest with the manufacturers themselves, who apparently believe that, by forcing literature on inferior products together with the good upon the buyer, they gain enough to pay for the extra printing and mailing costs and at the same time secure greater publicity. The advantages to the seller of such a method must be doubted; there is, however, no

doubt as to its disadvantages to the buyer, who unknowingly purchases a poor article, depending upon the general good reputation of a manufacturer's products.

Indexing Trade Literature

George S. Comstock discussed the paper in part as follows: Several years ago he adopted 8½ x 11 in. as a standard size for all circulars and office forms, in loose sheets, arranged for standard punching. His catalogues are built up of loose sheets, each sheet being devoted as nearly as may be to a single machine or subject, with a surprising saving of printing bills, and a resulting up-to-dateness, impossible in bound books. So satisfactory has been his experience that he likes to hope for the day when all the literature will conform to some such standard, thus making possible an equally efficient catalogue filing system.

In the latter field he has adopted a decimal system, similar to the well-known Dewey system for cataloguing libraries, and the scheme has worked well. He divides all materials, finished and unfinished, under nine general heads as follows:

1.00 General.
2.00 Mechanical Engineering.
3.00 Electrical Engineering.
4.00 Hydraulic Engineering.
5.00 Agricultural Engineering.
6.00 Civil Engineering.
7.00 Mining and Metallurgy.
8.00 Sanitary Engineering, Chemistry.
9.00 Architecture, Art.

These particular divisions, and subsequent subdivisions, are not offered as by any means ideal, but grew out of a gradual development of the new scheme, while abandoning the old. The heads will care for only a very small and little used file, and here at once the decimal system begins to work. Suppose, for example, one is chiefly interested in mechanical engineering: we will then need to develop the second heading, 2.00, and such a file may take the following form:

2.00 MECHANICAL ENGINEERING.
2.10 Machine Shop.
2.20 Wood Shop.
2.30 Smith Shop.
2.40 Boiler Shop.
2.50 Power Plants.
2.60 Foundry.
2.70 Hoisting and Handling Materials.
2.80 Transmission of Power.
2.90 Compressed Air.

Going further in the direction in which he is chiefly interested the development of compressed air (2.90) naturally follows, with this result:

2.90 COMPRESSED AIR.
2.91 Technical Literature.
2.92 Air Compressors, General.
2.93 Air Tools, General.
2.94 Advertising, Special.
2.95
2.96
2.97 Compressed Air Pumping.
2.98 Compressed Air Transmission.
2.99 Compressed Air, Miscellaneous.

Going still further, heading 2.92 expands into this:

2.92 AIR COMPRESSORS, GENERAL.
2.921 Steam Driven Air Compressors.
2.922 Belt Driven Air Compressors.
2.923 Electrically Driven Air Compressors.
2.924 Vacuum Pumps.
2.925 Hand-operated Air Compressors.
2.926
2.927
2.928
2.929 Air Compressor Parts.

and 2.93 is expanded into:

2.93 AIR TOOLS, GENERAL.
2.931 Compressed Air Hammers and Riveters.
2.932 Drills.
2.933 Grinders.
2.934 Hoists and Motors.
2.935 Stone Cutting.
2.936 Forges.
2.937 Sand Blast.
2.938 Nozzles for Spraying, Painting, etc.
2.939

while 2.98 is subdivided thus:

2.980 COMPRESSED AIR TRANSMISSION.
1 Air Hose.
2 Air Hose Couplings.
3 Air Receivers.
4 Air Valves.
5
6
7

It is evident that each of the original headings may be in like manner expanded to meet the requirements of each office, and it will also be noted that there is no limit to the expansion of each subject.

Card Indexes of Manufacturers

In connection with this system Mr. Comstock uses two card indexes, one for names and one for commodities. A name card may refer to several different file numbers, as, for example:

Ohio Injector Co.
Injectors 2.512
Lubricators 1.70
Brass Valves 4.32

and in like manner a subject card may contain the names of many manufacturers of, or dealers in, that particular article, for example:

Vises 2.16

See also Foot Vises, Pneumatic Vises.

Tower & Lyon, New York.....2.16
Columbian Hardware Company, Cleveland.....2.16
Herman Boker & Co., New York.....2.16
Powell Clouds & Co., Philadelphia.....2.16
Hollands Mfg. Company, Erie.....2.16

When trade literature is to be filed it is stamped with date of receipt and a place for the proper file number, as well as checks for indexing by name and one or more subjects. If the literature received is not of particular interest it may be filed under any heading from the original head down to whatever subdivisions may have been made. In practice, in an office where compressed air has but slight interest, a circular marked 2.982 could be filed in 2.00 if not subdivided, or 2.90, etc., with the advantage that if subdivisions are ever made the circulars are ready to go into their proper place.

A standard vertical filing case will care for such a filing system, or the common box files may be used. In either case, under present conditions, bound books must be cared for separately, although they are marked according to the same system.

Now, going back to Mr. Mahon's paper, suppose in a supernatural course of events all trade literature was of one size, and each subject treated on single loose-leaf circular, see how beautifully the decimal system would work out. From my experience with catalogue files I would suggest the following as an ideal system:

(A) All trade literature to be printed on 8½ x 11-in. sheets with some standard punching.

(B) Each circular to have in large numerals the standard decimal filing number, in addition to any private form numbers.

(C) Each circular to be devoted as nearly as possible to one article or subject.

To bring about such an ideal condition as suggested it would be necessary for the various manufacturers' associations and engineering societies to establish for trade literature such a standard of decimal symbols as is now done for librarians by the Dewey system.

To Study American Technical Education

Prof. Dr. Conrad Matschoss, dozent of the Royal Technical High School of Charlottenburg, Berlin, started August 10 for the United States to make a study of the method of technical education in America. He comes as the official representative of the Verein Deutscher Ingenieure accredited to the American Society of Mechanical Engineers, which is to arrange for Dr. Matschoss' tour. One of the most important questions in Germany today appears to be how to educate engineers so that they will be more immediately available after graduation for practical work. It is thought that the system in Germany produces better theoretical engineers than the American, but they lack versatility and ability to adapt themselves, as do the Americans. While here Dr. Matschoss is to discuss with the American Society the details of the proposed joint meeting in Germany next year. There are indications even now of elaborate planning for the meeting, including a trip through the industrial sections of Germany, arrangements which augur well for the success of the meeting. Incidentally it is thought that Dr. Matschoss may make a report at the meeting of his investigations in this country.

The Machinery Markets

Reports from nearly all sections of the country describe business as being good for the season. In some quarters the first week of August is said to have had more machinery sales than in the whole month of July. New York dealers are doing a good day to day business in small sales and are bidding on a list of tools for a large trade school. The scarcity of skilled labor is being felt in New England. Metal working plants there are very busy and the demand for machine tools is improving. Chicago machinery houses are enjoying a steady run of sales and are looking to the Wabash and the Chicago & Alton railroads to come out soon with lists of requirements. Cincinnati is receiving a number of inquiries from the railroads and is also enjoying a good demand, both foreign and domestic, for electrically driven grinders, drills, etc., and small generators. There is a seasonable dullness in the South with only a moderate call for boilers and sawmill equipment, but the trade feels confidence in the prospect for good business in the fall. Plentiful rains in Texas give prospects of big crops there, making a good call for cotton handling machinery. Mexico is becoming a good market for oil drilling and pumping machinery, in territory not affected by political troubles. A fair business in electrical machinery for export has been done on the Pacific coast, and the outlook is gradually improving. Optimistic reports of industrial conditions continue to come from Canada. Building operations are plentiful and there is an unprecedented call for heating equipment.

New York

NEW YORK, August 14, 1912.

Quiet purchases of single tools or small groups has been the character of the business in the past week. The bulk of the sales were to small shops and industrial works which gives the trade much satisfaction, as this is taken to mean that the industries, as a whole, are feeling confidence in future business. Local railroads have purchased a few tools from stock and there has been one or two sales of heavy machines to concerns making railroad supplies. There are no new lists from the railroads except that of the Norkfolk & Western Railroad calling for an engine lathe, a boring mill and two turret lathes. The manual training movement is becoming a strong factor in the machinery trade and some good business is coming from this source. The Cornell University bought two lathes in the week and the Baron de Hirsch Trade School has come out with a fair-sized list of tools, mostly engine lathes. A feature of this list is that each tool specified is for a particular make, being well distributed among the various manufacturers.

The Baron de Hirsch Trade School List

One Hendy gear head engine lathe, 14 in. x 5 ft., with taper attachment.

One Prentice high-speed lathe, 12 in. x 5 or 6 ft., equipped with 10 in. four jaw Independent chuck union, No. 118.

One Whitcomb-Blaisdell engine lathe, double back geared, 13 in. x 5 or 6 ft. with taper attachment.

One Willard high-power engine lathe, 13 in. x 5 ft. or 6 ft.

One Lodge & Shipley, 145 in. three-step cone engine lathe.

One Reed engine lathe, 14 in. x 5 ft., taper attachment and extra set of change gears for metric thread.

One Hamilton engine lathe, 14 in. x 5 ft. with taper attachment.

One American Tool Works engine lathe, 14 in. x 5 or 6 ft., three step cone.

One Fay & Scott engine lathe, 14 in. x 5 ft.

One LeBlond engine lathe, 14 in. x 5 or 6 ft., taper attachment.

One Flather & Co., 14 in. x 5 ft. quick change feed engine lathe.

One Springfield engine lathe, 14 in. x 5 ft., with four step cone.

One Cincinnati milling machine, No. 2 plain.

One LeBlond No. 2 plain milling machine.

One Hendy milling machine, No. 1½ universal.

One Whitney Mfg. Company 20 in. water tool grinder, equipped with wheel truing device.

One Landis universal grinder with magnetic chuck attachment.

One Binsse Machine Company surface grinder, equipped with Walker magnetic chuck.

Two Gould & Eberhardt shapers.

One Warner & Swasey No. 2 universal back-geared turret lathe.

One William E. Gang Company, No. 0, radial drill.

One Rockford 14 in. drill press.

One J. G. Blount Company, No. 2, grinding machine equipped with 2 Norton emery wheels.

The above machines are mostly motor driven and with each machine a full list of attachments are also required.

The Robert Reiner Importing Company, Weehawken, N. J., manufacturers of embroidery machinery, has had plans prepared and awarded the contract to the Turner Construction Company, 11 Broadway, New York, for an addition to its factory. The building is to be 104 x 123 ft., of reinforced concrete throughout.

The Albany Foundry Company and the Troy Machinery Works, Associated, have completed plans for rebuilding their foundry and nickel plate shop, one-story, on Van Renssaeler Island, and construction work will soon be commenced. J. R. Marshall is manager.

The Fairmont Box Company, Canajoharie, N. Y., has been incorporated with a capital stock of $100,000 and will equip a factory for the manufacture of boxes, etc. B. Arkel and W. H. Lipe, New York City, and F. E. Barbour, Canajoharie, are the directors.

The East Creek Electric Light & Power Company, St. Johnsville, N. Y., is receiving bids for a one-story power house through its architects, Veelie, Blackwell & Buck, 49 Wall street, New York City.

The Niagara Silk Mills, North Tonawanda, has commenced work on a two-story addition to its plant on Sweeney street. The first story will be equipped for weaving and the second story for box making.

The United States Lighting & Heating Company, Niagara Falls, N. Y., is receiving bids for oil and acid buildings, 26 x 40 ft. and 20 x 43 ft., one story respectively; and a boiler house 40 x 69 ft., one story, which it will add to its plant.

The Shredded Wheat Company, Niagara Falls, N. Y., is taking bids on a factory building 80 x 260 ft., four stories and basement, with boiler house 30 x 50 ft., to be added to its plant on Buffalo avenue. The buildings will be fireproof and conform in appearance to the present plant. The cost of the additions with machinery equipment will be about $350,000.

The power house of the Jamestown Street Railway Company and the Chautauqua Traction Company, Jamestown, N. Y., was badly damaged by an explosion of coal gas and resulting fire August 10. The direct loss on building, machinery and equipment is $25,000.

The True Form Fillet Company, Buffalo, N. Y., has been incorporated with a capital stock of $100,000 to manufacture foundry supplies and will equip a factory for the purpose. The directors are Jacob D. Schakel, Harvey E. Kerr, Frank D. Reigel, Theodore King and Frank X. Ernst, Buffalo.

The F. Perots & Sons Company, Buffalo, is building a concrete and steel elevator addition to its melting plant on the Buffalo River at the foot of Childs street.

The F. N. Burt Company, Buffalo, has filed plans for an addition to its box factory on Niagara street.

The Buffalo Box Factory, Scoville street, Buffalo, is building an addition to its boiler house.

The Contractors Casting Machine Company, Buffalo, is building a small addition to its plant at Bridgeman street and the Erie railroad.

The American Radiator Company, Buffalo, is adding a blower building to its Bond plant at Rano street and the Delaware, Lackawanna & Western Railroad.

The Sterling Engine Company, Buffalo, manufacturers of motor boat and automobile engines at Niagara street and Auburn avenue, is receiving bids for an addition 100 x 120 ft., one story, to be made to its machine shop.

The William Guillott Mfg. Company, Buffalo, has been incorporated with a capital stock of $10,000 and has established a small plant for the manufacture of stamped metal goods for the automobile and the hardware trade. The present offices of the company are at 45 Garnet avenue. William Guillot, A. S. Guillott and Edward W. Reynolds, Buffalo, are the directors.

New England

BOSTON, MASS., August 13, 1912.

The dog days have brought little of their usual depressing influence on the manufactures of machinery and metal products generally, and everyone seems to have complete confidence that business will be increasingly good during the remainder of the year, and on through 1913. The unanimity of opinion is most encouraging after the somewhat chaotic expressions as to the outlook which has been voiced in the period preceding the past few months.

The Naugatuck Valley in Connecticut is typical. Including Bridgeport, which may be placed in this territory, and up through Waterbury, practically every house in the metal industry is either very busy or very much busier than for a long time. The brass business is very prosperous. Not a few concerns are operating with night shifts; travel in the evening recalls 1906-1907. Labor is very scarce. Not only are skilled men in great demand, but unskilled help is not plentiful, and local newspapers contain advertisements calling for this class of labor. The machine tool people report that the demand for their products is more diversified.

The Norton Grinding Company is making plans for the establishment of a foundry next year, for the manufacture of castings used in its grinding machines. The purpose is to erect a building in a corner of the property well removed from the present works.

The Bridgeport Deoxidized Bronze & Metal Company, Bridgeport, Conn., has made tentative plans for the erection of a foundry building adjacent to its present works, to be 90 x 178 ft. In it thirty-two large furnaces will be installed, adding to the company's output 40,000 lb. daily.

Whipple & Choate, Bridgeport, Conn., have established a new metal reclaiming plant at Black Rock, a suburb of the city, and have added machinery which will double the amount of material which can be handled.

The Bryant Electric Company, Bridgeport, Conn., one of the Westinghouse properties, is adding a story to a large addition which was erected last season.

Harvey Hubbell, Inc., Bridgeport, Conn., manufacturer of electric specialties and machinery, is erecting a five-story concrete building, 52 x 140 ft., which will be devoted to a general increase in manufacturing facilities.

The Boston & Maine Railroad, according to report, is planning for the electrification of its western division and the building of a low level freight line from East Deerfield, near Greenfield, Mass., to Mechanicsville, N. Y., where a very large freight yard will be established. The company will take a large percentage of the immense power which is in process of development on the Deerfield River.

Announcement is made at Chicopee, Mass., that a new corporation, the Quigley Furnace & Foundry Company, headed by C. K. Lassiter, head of the Baush Machine Tool Company, Springfield, Mass., and superintendent of the American Locomotive Company and W. S. Quigley, Rockwell, N. Y., will erect large works in Chicopee. The main building will be 150 x 300 ft., one story. A specialty will be made of heating, steel and forge furnaces.

The Bosch Magneto Company, Springfield, Mass., announces that it will release for manufacturing purposes the space in the building devoted to a lunch room, and a building will be erected for the latter purpose, 70 x 120 ft., one story. New equipment will be installed in the factory. This action definitely closes the plan of the company to move to New Jersey.

The new building of the New Departure Mfg. Company, Bristol, Conn., will be 60 x 212 ft., three stories. The first floor will be occupied for offices, and the upper stories for packing and shipping. No new equipment will be purchased.

The Pratt Drop Forge & Steel Company, Shelburne Falls, Mass., the organization of which was mentioned last week, states that it is not ready to make a detailed statement of its manufacturing plans, beyond the fact that a new factory will be erected at Shelburne Falls, and that the business will be developed as rapidly as possible. The plant will consist of a fireproof concrete and glass factory 40 x 100 ft., and a forge shop 40 ft. square.

The Hendee Mfg. Company, Springfield, Mass., manufacturers of motorcycles, states that the equipment of its new factory has not been decided upon. The building will be 40 x 300 ft., five stories, and will contain manufacturing facilities to increase the annual output of motorcycles from 19,000 to 35,000.

The foundry of the Belcher & Taylor Agricultural Tool Company, Chicopee Falls, Mass., together with its contents, was destroyed by fire August 10, with a loss of some $30,000. The structure will be rebuilt immediately.

The additions to the Hartford works of the United States Rubber Company, at Hartford, Conn., will consist of a power house 72 x 108 ft., and 80 ft. high, with engines and boilers to generate 3000 hp., and a manufacturing building 90 x 260 ft., five stories and basement. The Fisk Rubber Company, Chicopee Falls, Mass., will erect additions consisting of a six-story building, 90 x 250 ft., and a four-story structure 40 x 200 ft. The Cushnoc Paper Company, Augusta, Me., will add new steam boilers of 400 hp., in connection with improvements to the hydraulic power service.

Philadelphia

PHILADELPHIA, PA., August 14, 1912.

The week's business has been somewhat irregular. Some report the volume fully maintained; others, less activity. The vacation season is credited for the lack of uniformity, as a number of projects expected to be closed have been temporarily held up on that account. For the same reason some little falling off in inquiries is noted. On the whole, however, the general volume of business continues fair for the season. Manufacturers generally have been receiving an increased number of orders and greater plant activity is noted with a number. While few large projects have developed, the trade is awaiting tool lists from several railroads, at least one of which promises to be extensive. Local railroad buying continues along very narrow lines, although it is expected to improve some time this fall. In some classes of machine tools deliveries are hardening, but ordinary equipment can still be had promptly. More confidence in the future is generally expressed; continued activity is noted in the iron and steel trades; industrial lines generally are improving and indications point to large crops. Under the circumstances the trade anticipates quite an active fall movement in machinery and tools.

Second-hand machine tools have been in fairly good demand. Some little betterment in the demand for boilers is noted, but that for engines has not been very active. The demand for machinery, as well as general castings, both gray iron and steel, is improving. Steel casting plants in this district are, for the most part, fully engaged, while gray iron foundries are increasing production. Higher prices are being quoted for both steel and iron castings.

The Brehm-Stehle Company Dye Works, Allegheny and Trenton avenues, has received bids for a one-story boiler house, 40 x 48 ft., and is in the market for two 75-hp. return tubular boilers.

Charles Lentz & Sons, 18 North Eleventh street, have acquired properties at Seventeenth and Ramstead streets, on which they will erect a six-story fireproof building, which they will use for the manufacture and sale of hospital and physicians' supplies. It is probable that construction of the new building will not be undertaken until spring.

F. R. Hansel and Charles Martin, Philadelphia, and S. Seymour, Camden, N. J., are reported as being identified with a new corporation to be known as the Universal Shoe & Forge Company, with a capital stock of $300,000. Detailed information regarding this concern is not available.

The Keystone Drop Forge Company, Chester, Pa., reports a steady improvement in the general demand for drop forgings. The plant is being operated at full capacity, covering a large variety of railroad, automobile and special work.

The Schutte & Koerting Company, which recently acquired a tract of land at Cornwells, Pa., is now said to be taking bids on a one-story brass foundry power-house and testing station to be erected on a part of the site.

John A. Roebling's Sons Company, Trenton, N. J., advises that the facts regarding its purchase of a tract of land and establishment of a large plant at Dollar Bay, Mich., have been exaggerated. The company has purchased the property of the Dollar Bay Improvement Company, consisting of between 200,000 and 300,000 acres, having possible mineral rights, and some timber and town lots, together with a few houses. The copper rolling and wire mill connected with the property has been operated by the Roeblings for a number of years, and will be continued. At present,

however, they have no idea of enlarging the plant, but will continue to operate it with a few small additions and repairs.

The Light Mfg. & Foundry Company, Pottstown, Pa., which some time ago advised that it intended to make extensive additions to its plant, is now taking estimates on an 88 x 236-ft. foundry building, and a two-story office and manufacturing building, 32 x 160 ft., to be erected adjacent to its present plant.

The Baldwin Locomotive Works has recently received orders for 62 locomotives; 10 of these are for the Great Northern Railway, 8 for the Virginian Railway, 30 for the Southern Railway and 10 for the Central Railroad of New Jersey. The plant of the company is now more fully engaged than it has been for a long time, and has a large volume of business on its books. Recent reports that it would engage in the manufacture of motor trucks are denied by officials of the company.

The Jansen Steel & Iron Company, Columbia, Pa., is erecting an addition, 80 x 80 ft., to its plant. It also contemplates adding a bolt, nut and spike manufacturing department.

A. B. Eby, Paradise, Pa., has leased a building in Columbia, where he will establish a machine and pattern working shop and will soon be in the market for lathes, drill presses, grinders, etc.

Edmund B. Ulrich, city engineer, Reading, Pa., will receive bids until August 21 for the installation of centrifugal pumps, electric motors and appurtenances at the house sewage pumping station in that city.

Announcement is made in the daily prints that a small fire damaged a portion of the foundry of the Hunsicker Engineering Company, Lebanon, Pa. The loss, it is stated, was not large. Details are not available at this time.

The Pearson & Ludascher Lumber Company, Westmoreland and Delaware avenues, is taking estimates for a one and two-story brick and concrete planing mill 150 ft. square. Advices as to probable machinery requirements are not available.

Day & Zimmerman, engineers, have awarded the contract for the erection of a $125,000 plant for the Gurney Electric Company, Honesdale, Pa., to F. A. Havens & Co., this city. The plant, of which previous mention has been made, will consist of a shop 212 x 160 ft.; a foundry 150 x 82 ft., a heating plant and various other buildings.

The city of Camden, N. J., will receive bids until September 19 for a 5,000,000-gal. pumping plant. H. M. Herbert is chief engineer.

Chicago

CHICAGO, ILL., August 13, 1912.

With a number of interesting railroad machine tool lists still pending and with a volume of general sales well maintained the outlook in the local machinery market continues attractive. The prospect of purchases in the near future by the Wabash for its shops at Decatur and by the Chicago & Alton in connection with the improvements to be made at Bloomington adds to the encouraging aspects of the situation. Sales of a number of the highest priced tools are noted, including an order for a large turret lathe and another group of machines aggregating $5,000 in value. In some quarters the first week in August witnessed the placing of more business than in the entire month of July, and the general broadening of business activity is expected to yield a steady increase in the machinery trade.

The Accurate Engineering Company, Chicago, has been incorporated with a capital stock of $10,000 to engage in the implement, engineering and hardware business. The incorporators are George W. Mainerre, T. N. Pratt and G. A. Minnich.

Schmitz Mfg. Company, Chicago, has been incorporated with a capital stock of $10,000 by Henry Koller, Murdock Campbell and Ernst Schmitz, for the purpose of manufacturing dies, tools and machinery.

The American Office Machine Company, Chicago, with a capital stock of $100,000, has been organized for manufacturing and dealing in machinery by Sidney Adler, Hyman Weiss and Walter H. Cotton.

The Illinois Brass Mfg. Company, Chicago, has been incorporated with a capital stock of $5,000 by L. A. Heile, Frank T. Milchrist and J. H. Christensen.

President Worthington of the Chicago & Alton Railroad, since his accession to the presidency, has given considerable attention to the condition of the company's shops at Bloomington, Ill., and there no longer seems reason to doubt that the rebuilding of present plant or the construction of entirely new facilities will be undertaken in the near future.

The Emerson-Brantingham Company, Rockford, Ill., whose merger plans were recently announced, is about to erect additions to the Rockford plant, one building to be 300 x 700 ft., another 240 x 700 ft. It is the intention to manufacture tractors in the new plant.

Barnard & Leas, Moline, Ill., are about to let contracts for new shop building, including a machine shop, 140 x 150 ft., one story. Woodworking and power shop are also to be constructed.

The Rockford Steam Boiler Works, Rockford, Ill., James McClaren, proprietor, is erecting a new plant on the site of the present factory.

The Northern Brass Mfg. Company, Waukegan, Ill., has filed notice of an increase in its capital stock from $16,500 to $55,000.

The Appleton Mfg. Company, Batavia, Ill., is about to erect an addition to its plant, 40 x 172 ft., for its woodworking and machinery departments.

The Standard Foundry & Mfg. Company, De Kalb, Ill., is about to double the capacity of its foundry with an addition, 50 x 160 ft. General foundry equipment, including molding machines and overhead crane, will be installed.

The Spiral Radiator Company, St. Paul, Minn., is adding to its plant by the erection of a new building 100 x 120 ft. John O. Olson is president.

The Hildebrand Mfg. & Supply Company, Sheboygan, Wis., has been incorporated with a capital stock of $30,000. W. E. Hildebrand is president.

The Thomas B. Jeffrey Company, Kenosha, Wis., automobile manufacturer, has purchased additional plant site of about nine acres upon which it is the intention to erect additional factory buildings.

The Wadewitz Machinery Company, Racine, Wis., has been incorporated with a capital stock of $25,000 by A. H. Wadewitz, O. E. Wadewitz and E. H. Wadewitz.

The Hart-Parr Company, St. Charles, Iowa. is making arrangements for additional financing following which an extension of the business is contemplated.

The Wilson Machinery Company, Des Moines, Iowa, has engaged larger quarters for its foundry and machine shop in a building 125 x 250 ft.

Cincinnati

CINCINNATI, OHIO, August 13, 1912.

Inquiries from the railroads for machine tools continue to come in, but it is reported that actual purchases have been rather slow, taking into consideration the large number of machines wanted. However, business from the general trade is increasing steadily and should the railroads come into the market all at once, there would be a quick cleaning up of stocks, with a resultant delay in deliveries.

There is an excellent call, both from domestic and foreign users, for electrically driven grinders, drills, etc., there is also a good demand for small generators and motors. Second-hand machinery dealers report a slight improvement, but conditions with them are not yet satisfactory. Practically all the foundries in this section are busier, and are preparing for a more active fall season.

The Columbus Foundry & Machine Company, Columbus, Ohio, whose incorporation with $500,000 capital stock has been previously mentioned, has placed contracts for the construction and equipping of a modern manufacturing plant to make gas, gasoline and oil engines, up to 600 hp., mechanical stokers, shaking grates, pipe machines, etc. The power equipment and machine tools are yet to be purchased. The new company, of which D. H. Palmer is president, took over the business of the Columbus Machine Company, Columbus, and the Vulcan Furnace Company, Warren, Ohio.

The Stewart Iron Works Company, Covington, Ky., desires to secure bids on a sprinkler system to be installed in a three-story building, 100 x 450 ft., to be used for the manufacture of auto trucks. As recently noted, this company will also require a lot of machine tools, that have not as yet been purchased. John J. Craig, Covington, has contract for the above building, as well as for the reconstruction of the Stewart Iron Works Company's iron fence factory.

The Cincinnati-Bickford Tool Company, Oakley, Ohio, has decided to enlarge its plant by the addition of a one-story building, 50 x 150 ft. Part of the new building will be used for cleaning and storing castings.

Bertsch & Co., Cambridge City, Ind., whose plans for constructing a new foundry have been previously noted, has not yet purchased all of the necessary equip-

ment for the proposed building. An original inquiry calls for two cupolas, with inside diameters about 63 in. and 72 in. respectively. Blowers and alternating current motors for operating these cupolas will also be needed, as well as sand blast equipment.

The Sterling Glass Company, Cincinnati, has had plans prepared for doubling the capacity of its plant. The company makes a specialty of cut glass and will probably require a small amount of power transmission equipment.

The Eagle Mfg. Company, Cincinnati, whose plant for the manufacture of washing machines is in Cumminsville suburb, is increasing its output and is in the market for a quantity of machinery, including screw cutting and drilling machines and probably some woodworking equipment.

The Globe Automatic Sprinkler Company, Cincinnati, whose offices have heretofore been located in the First National Bank Building, has moved to its new factory at 1610-1620 Reading road.

The Union Coal & Ice Company, Chillicothe, Ohio, has had plans prepared by Architect Barnard T. Wisenall, Cincinnati, for a building to house a 40-ton ice plant that the company intends to put in operation before next season.

The Kanawha Glass Company, Charleston, W. Va., is a new incorporation with $75,000 capital stock to manufacture glass. L. H. Harrison and J. D. Pribble are named among the incorporators.

The Dayton Malleable Iron Company, Dayton, Ohio, has completed plans for a new plant that will be completed before the winter season begins.

Indianapolis

INDIANAPOLIS, IND., August 13, 1912.

The Keyless Lock Company, Indianapolis, will erect a foundry to cost $75,000. It will be two stories and fireproof and will be used exclusively for the manufacture of brass and aluminum automobile castings. The equipment will include a battery of molding machines and a sand blast. The building will be of brick and steel.

The National Color Press Company, Indianapolis, has been incorporated with $50,000 capital stock to manufacture lithograph machinery. The directors are Robert Henkel, William Henkel, G. K. Henderson, W. L. Dynes and I. J. Swartz.

The Jabez Wooley Coal Company, Evansville, Ind., is sinking a mine which will be the largest in Knox County. It will have a steel tipple, two shafts and will be electric lighted. The workings will be of concrete.

The Locomotive Superheater Company has bought a site for a plant near Hammond, Ind.

The Wild Cat Electric Company, Cutler, Ind., has been organized and is selling stock to raise money for the building of an electric power-house at Adam's mill dam. Jesse Johnson, owner of the mill, is one of the promoters of the electric company.

The Cannelton Public Service Company, Cannelton, Ind., has been incorporated with $10,000 capital stock to furnish water, heat, light and power. The directors are L. Rodman, M. F. Casper and J. T. Hay.

The McDonald Bros. Pitless Scale Company, New Castle, Ind., has dissolved.

The Condit-McGinnity Contracting Company, Gary, Ind., has been incorporated with $20,000 capital stock to do general construction work. The directors are O. S. McGinnity, G. P. Condit and F. J. Sheehan.

The Central Mfg. Company, Terre Haute, Ind., has dissolved.

The Aurora Gas Light & Coal Company, Aurora, Ind., has sold its plant to the Indiana Public Service Company for $18,800. The old plant will be repaired.

The Four-in-One Mfg. Company, Mishawaka, Ind., has been incorporated with $7,500 capital stock to manufacture step-ladders and other articles. The directors are E. F. Forstbauer, D. H. Turnbull and W. E. Zweigle.

The Freeman Mfg. Company, Alexandria, Ind., has increased its capital stock $10,000.

The Waterworks System of Sullivan, Ind., has been transferred from the city to the Sullivan Water Company, composed of Vincennes capitalists, which will install a new system. The company has a franchise for 25 years and a contract with the city for 20 years.

The McCray Refrigerator Company, Kendallville, Ind., is installing a new power plant at a cost of $50,000, which will add about 1000 hp. to its present capacity.

The Marvel Carbureter Company, Indianapolis, has entered into an arrangement whereby it will move to Flint, Mich., where it has secured a building 50 x 150 ft., three stories.

Detroit

DETROIT, MICH., August 13, 1912.

The volume of business in this territory continues fair. A number of dealers state that they do not look for any decided falling off in trade during the month, and from September 1 an upward trend in the market is expected. No large sales of metal-working tools have been reported the past week, but woodworking machinery and several lines of special equipment have been fairly active. Some good business in pneumatic tools is being transacted. A good current business is moving in general power equipment and power transmission specialties. Second-hand machinery is more active and one dealer reports inquiries more plentiful than at any time in June or July, a large part of the prospective business being from manufacturing centers outside of Detroit. The continued activity of the foundries in Detroit this year has resulted in numerous increases in capacity, and dealers in foundry equipment have placed considerable business lately. Engineers are estimating on a number of installations of small waterworks in various parts of the State, and some equipment for these plants is now being figured on. Building conditions are slightly more active, but contractors are still handicapped by a scarcity of labor and of some classes of materials.

The Security Trust Company, Detroit, receiver of the Dundee Hydraulic Power Company of Dundee, Mich., is receiving bids for the reconstruction of that company's electric light plant and transmission lines and is also asking for tenders on a 75-kw. generator and exciter machine and considerable miscellaneous supplies.

John M. Welch and associates, Detroit, have purchased 20 acres in Ecorse, a Detroit suburb, and plan the establishment of a brick manufacturing plant.

The Keeton Motor Car Company, Detroit, has acquired a large plant in Wyandotte, Detroit suburb, and is installing equipment. The plant comprises a building 80 x 320 ft., two stories, and two smaller structures.

The Sieder Mfg. Company, Detroit, tent and awning manufacturer, has increased its capital stock from $20,000 to $100,000.

The Michigan Motor Specialties Company, Detroit, has been incorporated with $75,000 capital stock to manufacture automobile accessories and electrical specialties. The incorporators are N. M. Beck, C. W. Beck and Charles Wright, Jr.

The Wabash Railroad has taken out a permit for the erection of a one-story brick roundhouse 100 x 500 ft., to cost $53,000, at Cedar and West End avenues, Detroit.

The Menzie Shoe Company, Detroit, shoe manufacturer, has increased its capital stock from $80,000 to $200,000.

The Michigan Central Railroad has awarded a contract to George B. Swift & Co., Chicago, for the construction of a large roundhouse and extensive car shops at Bay City, Mich., the estimated cost of which is $200,000. The plans call for an independent waterworks and sewerage system and it is estimated that the total cost of the improvements, including mechanical equipment, will reach $500,000.

The Benzie County Power Company, Frankfort, Mich., has asked permission of the Michigan Railroad Commission to incorporate for $75,000. The company proposes to establish a hydroelectric plant on the Benzie River near Frankfort, and the stockholders named include Eugene Zimmermann, Cincinnati; William Louden and John F. Jenks, Frankfort.

The Ottawa Leather Company, Grand Haven, Mich., tanner, will erect an addition, 60 x 200 ft., to its finishing room. B. E. Parks & Sons are the architects.

The Rite-Way Company, Battle Creek, Mich., has been incorporated with $50,000 capital stock to manufacture coffee roasters. Charles Dorman, Battle Creek, and George Gaw, Jr., Ypsilanti, Mich., are the principal stockholders.

The Board of Fire and Water Commissioners, Marquette, Mich., are asking for bids on three horizontal shaft, water-driven, centrifugal pumping units and one motor-driven air pump.

The city of Kalamazoo, Mich., is having plans prepared for the reconstruction of the municipal lighting plant and for the extension of the lighting system.

Woodmansee, Davidson & Sessions, Chicago, are the engineers.

The Munising Veneer Company, Munising, Mich., has been incorporated with $100,000 capital stock, and will take over and continue the business of the Great Lakes Veneer Company. A number of improvements will be made to the plant to increase its capacity.

The village of Deckerville, Mich., has issued $19,500 in bonds for the installation of an electric lighting and waterworks plant and desires bids covering the construction of the same.

The Grand Rapids Mining & Smelting Company, Grand Rapids, Mich., has been organized with $10,000 capital stock to do a general mining business. The incorporators include F. V. Clark, M. C. Brown and C. W. Calkins.

The Diamond Crystal Salt Company, St. Clair, Mich., will double the capacity of its cooperage shop.

The plant of the Grand Rapids Felting Company, Grand Rapids, Mich., mattress manufacturer, was destroyed by fire August 3, causing a loss of $12,000. It will probably be rebuilt.

A. L. Holmes, Romeo, Mich., has acquired a plant at Port Huron, Mich., and will establish a foundry for the manufacture of motor cylinders and piston rings. Two cupolas with a capacity of 15 tons a day will be installed. The new plant will be operated as a branch of the Romeo Foundry Company.

The Pioneer Boat & Pattern Company, Muskegon, Mich., has been placed in the hands of Chauncey Gregory as receiver on the petition of stockholders. The plant will be continued in operation until a sale can be effected.

The Holland-St. Louis Sugar Company is building a large addition to its plant at Holland, Mich., and will install machinery for drying beet pulp.

The Michigan Paper Company, Plainwell, Mich., has awarded a contract for the erection of a new cooker house. The building will be 66 x 88 ft., three stories.

The Ready Rax Mfg. Company has been incorporated at Escanaba, Mich., with $15,000 capital stock and will engage in the manufacture of carpet and rug racks.

It is reported that the Seator Machine Mfg. Company, Jackson, Mich., whose incorporation was announced last week, has acquired a large factory at Battle Creek, Mich., and will equip it for the manufacture of bread wrapping machines.

The Clark Carter Automobile Company, Jackson, Mich., is completing the construction of a four-story addition to its plant.

Champion Ignition Company, Flint, Mich., is engaged in the building of an addition to its factory to double its capacity.

The Central South

LOUISVILLE, KY., August 13, 1912.

Business continues to rule quiet in all quarters, but the situation looks better than it did last week, for the current depression is but short-lived, as a matter of course, and improvement is to be surely expected, rather than further slackness. The influences to which the off season is attributed are chiefly those of cool weather and the natural lack of interest at this time of the year in industry because of vacation time. Many prospective machinery buyers are not to be found at their permanent addresses. The building field is fertile, however, for cool, sunshiny weather of the sort now prevailing is just what the builders demand. Conversely, ice machinery does not command much of a call during the cool snap and slackness in wood-working equipment has resulted from rain in the timber districts. The slowness with which electrical machinery is moving is attributed to the absence of buyers on vacations.

The Henry Vogt Machine Company, Louisville, is now installing a power plant which is to be used as an auxiliary with that employed by the company for years at its extensive series of boiler and ice machine shops. A battery of boilers and the necessary electrical equipment for 300 kw. power is being installed, the company furnishing its own machinery in this connection.

A saw-mill of considerable capacity is to be installed and a logging railroad will be operated upon a tract of timber land near Waynesville, N. C., which was recenty purchased by J. C. Campbell, a prominent lumberman of Marion, Va.

A new water company, which is backing an enterprise to furnish Horse Cave, Ky., with water, has been organized in that city with J. O. Redford as president; J. L. Martin as vice-president, and P. S. Bransetter, secretary-treasurer.

W. P. Childress is contemplating the purchase and installation of saw-mill equipment upon newly developed timberland at Pikeville, Ky.

An 8-ton refrigerating plant for the Central Insane Asylum of Tennessee near Nashville has been installed by the John Bouchard & Sons Company, of Nashville. The Bouchard Company has completed the following contracts in the last few weeks: An 8-ton refrigerating plant for the Glencliff dairy, 10-ton refrigerating plant for the Anderson Fish & Oyster Company, a 10-ton plant for Jacob Bhos, a 2-ton plant for Cannady & Stephens, grocers, all of Nashville.

On or before January 1 the Middlesboro Ice Company will commence operations at its new plant in Middlesboro, Ky. The equipment for the new refrigerator is to be supplied by the Henry Vogt Machine Company, of Louisville.

The Rudolph Brake Company, Paducah, Ky., has been organized with a capital stock of $10,000, to manufacture brakes. R. E. Rudolph is the inventor of the brake and is associated with H. B. Sewall and others in the new company.

The Columbus Auto Parts Company has definitely decided to locate and establish an extensive plant for the manufacture of motor parts in Columbus, Ind. About 150 building lots have just been sold in Columbus, guaranteeing the coming of the new industry and providing a fund of $45,000 as a nucleus. The concern is backed by F. H. Penfield, Fletcher Goodwell, Benjamin S. Dean, all of Jamestown, N. Y., and J. J. Handley, of Indianapolis, Ind.

Emmett Smith, of Chicago, Ill., is reported to be negotiating for the establishment of a new electric light and power plant in Hodgenville, Ky.

The Ala-Cola Company, Nashville, Tenn., has been incorporated with $25,000 capital stock to found a bottling works. The company is incorporated by R. A. Henry, Ira B. Clark and others.

The Press & Banner Company has been incorporated in Abbeville, S. C., with a capital stock of $10,000. W. W. Bradley is president of the new printing concern.

Contracts for the erection of a two-story brick printing plant in Greenville, S. C., have been awarded by S. A. Nettles, president of the Advocate Publishing Company. The new plant is to be 36 x 130 ft. in dimension.

W. F. Garrettson, E. H. Grieger and E. A. Polumbus are the incorporators of the Beattyville Stone Company, Beattyville, Ky., a concern which will engage in the cut stone trade, with a capital stock of $10,000.

A $40,000 ice plant is to be built in the immediate future in Reidsville, N. C., by John J. Mines and associates.

The mayor of Raleigh, N. C., is in possession of plans and specifications for a municipal refrigerating plant that is to be installed.

The Johnson City Foundry & Machinery Company, Johnson City, Tenn., with a capital stock of $10,000, has been incorporated. The incorporators are S. C. Williams, A. B. Croud, G. T. Lee and others.

Although not yet prepared to announce details, the Stewart Iron Works Company, Cincinnati, O., is preparing plans for the rebuilding of its plant in Covington, Ky., which was recently destroyed by fire. Improvements and new equipment costing approximately $300,000 are to be added to the new establishment.

The city of Corydon, Ky., will vote in September to determine a proposed bond issue of $10,000 to cover the cost of a new electric lighting and power plant in Corydon.

W. F. Richardson, P. W. Holman and others in Glasgow, Ky., have purchased an electric light and power plant and are planning the installation of additional machinery.

That the automobile manufacturing plant of the Ames Motor Car Company in Owensboro, Ky., is to be enlarged to guarantee a capacity of 2000 cars per annum is the gist of a recent announcement by F. A. Ames, president of the concern. Additions are to be erected and equipped at the factory. The company was recently incorporated with $100,000 capital stock.

A building 166 x 200 ft., costing $20,000, is to be erected by the Prendergast Cotton Mills of Prendergast, Tenn. This structure is to be equipped with $80,000 worth of machinery, including 10,000 spindles driven by electric power. More than 200 men will be employed. W. J. McLenden, Jr., president of the recently organized mills, is in charge of the enterprise.

Birmingham

BIRMINGHAM, ALA., August 12, 1912.

The month of August thus far has been a trifle disappointing to the mill and machinery and supply men. They expected a better business than came forth. At the same time there was a fair amount of current transactions in machinery, pumps, machine tools and small supplies such as belting, while the inquiries are altogether of a satisfactory nature. They clearly indicate that there is going to be a good business in the autumn season. Actual selling business has been in spurts, but the inquiries are steady. As a result dealers are not at all worried over the situation, but on the contrary rather optimistic.

Milltown, Ga., has voted an issue of $10,000 of waterworks bonds.

Ocala, Fla., has voted $100,000 of bonds to build a new water plant or buy out the private waterworks now operating. Arthur Pew of Atlanta is on the board of engineers to decide the question.

The Birmingham Metal Products Company, Birmingham, Ala., has increased its capital stock from $2,000 to $150,000. J. H. Dean is president and Solon Jacobs is secretary.

A large tract of land at Phelps, near Dalton, Ga., has been purchased by F. T. Hardwick and G. W. Hamilton of Crown Cotton Mills of Dalton for the purpose of erecting cotton mills.

Extensive improvements have been begun in the factory of the Cherokee Fertilizer Company, Macon, Ga. Its capacity is to be doubled.

The Ellenton Gin Company, Ellenton, Ga., has been chartered by H. L. Harrell, John A. Carlton and others.

The McRae Pecan Company will establish a ginnery in place of one recently burned at McRae, Ga.

Robert Gamble of Jacksonville, Fla., and associates, will incorporate a company with $200,000 capital stock to establish an ice factory with an initial capacity of 100 tons a day and capacity to be doubled in a year. W. C. Lewis, Tallahassee, Fla., is vice-president.

The Moore Ice Works has bought the plant of Stratton Ice Works at Pensacola, Fla., and will increase its capacity by 50 tons.

T. G. Roberts, Red Oak, Ga., and N. S. Carr, Montgomery, are reported as about to estabish an ice plant at Woodbury, Ga.

The city of Eatonton, Ga., has employed the Solomon-Norcross Company, consulting engineer, to design municipal lighting and power plant.

Punta Gorda Land & Lumber Company, Punta Gorda, Fla., has been incorporated by Hugh McLean, Buffalo, N. Y., Cassius M. Carrier, Punta Gorda, and others to establish lumber manufacturing and naval stores business. Capital $1,000,000.

Sulzberger & Sons will double the capacity of the plant at Savannah, Ga., formerly operated under the style of Schwarzschild & Sulzberger. A refrigerating plant, smoke house, etc., are to be installed.

The Augusta-Aiken Railway & Electric Company, of Augusta, Ga., will improve its power plants. New machinery will be installed.

Joseph J. Hurlburt and M. G. Stouck of Lock Haven, Pa., contemplate establishment of a wood pulp and paper mill at Tuscaloosa, Ala., utilizing pine timber and sawmill refuse.

The Murray Gin Company, Dallas, Texas, will erect additional buildings at the Van Winkle plant in Atlanta, Ga., which the company purchased. John H. McDonough, Atlanta, Ga., is general manager.

W. A. and C. C. Cooper of Grayson, Ga., have bought the oil and fertilizer factory of the Lawrenceville Oil & Mfg. Company at Lawrenceville, Ga., and will operate as the Lawrenceville Fertilizer Company with a capital stock of $100,000.

The Light, Heat & Power Company, Boston, Mass., will construct a gas plant at Daytona, Fla., with a capacity of 50,000,000 ft. E. L. Gunn, Daytona, in charge.

Swainsboro, Ga., has selected a site for a municipal lighting plant, for which $7,500 of bonds was voted. Solomon Tyson is mayor.

The Pierce Coal & Lumber Company, Birmingham, Ala., will open a coal mine at Lime Rock, Ala.

The Hughes Company, Florala, will erect an $8,000 grist mill.

The Rock Island Sponge Company, recently incorporated at Carrabelle, Fla., with $100,000 capital stock, will open bids about September 1 for the construction of mills. L. O. Benton, Monticello, Ga., is president and Lynn Kilbourne, of Carrabelle, treasurer.

The Griffin Buggy Company, Griffin, Ga., has been organized by J. E. Evans and John H. Ward and will proceed with the erection of a buggy manufacturing plant.

The Bay City Packing Company, Apalachicola, Fla., Joseph Messina, president, will enlarge its plant and install additional machinery.

The Panama City Compress Company, Panama City, Fla., has been incorporated with a capital stock of $35,000. J. M. Phillips is president.

The Mary-Leila mill at Greensboro, Ga., will install 6000 spindles, a new engine and boiler, etc.

The Monroe Oil & Fertilizer Company, Monroe, Ga., is preparing to double the crushing capacity of its plant at Bostwick, Ga.

St. Louis

ST. LOUIS, MO., August 12, 1912.

Business in the machine tool trade during the past week has been quite satisfactory, though no new lists of consequence have come out. Most of the transactions have been in single tools and there has been some request for second-hand machines. Reports from the surrounding territory are good as to prospects and collections are improving somewhat. In general the outlook is satisfactory to the dealers.

The Standard-Tilton Milling Company has taken out a permit to build an addition to its mill and warehouse in St. Louis and will add some equipment.

The Copper-Clad Malleable Range Company, St. Louis, has leased new quarters and will remodel and re-equip its plant, greatly enlarging its manufacturing capacity.

The St. Louis Cordage Company, St. Louis, has begun the construction of a large addition to its plant and will add considerable new equipment on completion of the building.

The Commerce Power Company, Kansas City, Mo., with $75,000 capital stock, has been organized by W. T. Kemper, R. C. Menefee and H. C. Schnitegebel to install a power producing plant.

The Buckeye Lumber & Heating Company, Hough, Mo., has been organized by P. A. and D. Desgranger and W. S. Gardner and will equip a lumber mill at once.

The John Hague Engineering Company, St. Louis, with $12,500 capital stock, has been organized by John Hague, Edgar Steiner and Paul Zimberlmann, to manufacture and install mechanical refrigerating plants.

The Atchison, Topeka & Santa Fe Railroad has let the contract for a new roundhouse at Marceline, Mo., to cost $50,000.

The American Gravel Company, Carthage, Mo., has been organized by S. A. and E. M. Fones, of Joplin, and will equip a plant to remill tailings from Webb City plants.

The Fidelity Lumber Company, Kansas City, Mo., recently incorporated with $650,000 capital stock, has acquired lands in Texas and will operate a mill near Doucette, in that State, and at other points. C. B. Sweet is president; others associated with him are F. J. Bannister, J. H. Foresman and William Peters.

An electric light and power plant is being promoted at Maryville, Mo., by Richard Kuchs, who has organized the Maryville Electric Light & Power Company. It is planned to supply power to several nearby towns.

The Midland Battery Company, Kansas City, Mo., recently organized to manufacture storage batteries by A. C. Owens, Samuel Silverman and Charles N. Bird, will install about $7,000 worth of mechanical equipment.

The O'Fallon Oil & Development Company, O'Fallon, Ill., with $10,000 capital stock, has been organized by J. E. and J. B. Yoch and W. M. Reidelberger to develop oil property owned by them.

The Fisher Fuel Company, Millstadt, Ill., with $50,000 capital stock, has been organized by J. A. Knowlton, W. L. King and R. K. McSkimin to equip and operate mining property owned by them.

The Mueller Electric Company, Ottawa, Ill., with $50,000 capital stock, has been organized by J. J. Mueller, J. J. Mueller, Jr., and B. Mueller, to equip an electric appliance manufacturing plant.

The White River Lumber Company, Des Arc, Ark., has been organized by C. D. Rhynes of that town and C. C. G. Leigh and D. F. Paff of Chicago.

The Arkansas Brick Mfg. Company, Little Rock, Ark., has increased its capital stock from $100,000 to $150,000 for the purpose of increasing its equipment.

A rice mill with 400 barrels daily capacity is to be equipped at Hickory Ridge, Ark., by Louis C. Noisaswald and others of New York City.

An electric light plant is contemplated by the city authorities of Hinton, Okla., who have employed Kennedy & Fleming of Oklahoma City to prepare plans.

A bond issue of $20,000 is to be submitted to the voters of Hooper, Okla., the proceeds to be devoted to an electric light plant.

A lighting and power system is to be constructed at Skiatook, Okla., with the funds realized from a bond issue which has been voted for the purpose.

V. V. Black, Ringwood, Okla., has completed plans for the construction of a cold storage warehouse with the necessary mechanical equipment.

The Creta Oil, Gas & Development Company, Oklahoma City, Okla., has been incorporated with $25,000 capital stock by W. F. Morrison, F. C. Gow, D. A. Bowersock and O. W. Dickerson.

A custom gin is to be equipped at Pontotoc, Okla., by the Pontotoc Custom Gin Company, incorporated with $10,000 capital stock by J. B. Stewart, A. M. Adams, J. R. Floyd, J. R. Revel, W. W. Daggs and T. M. Rushing.

The Fort Gibson Gin & Milling Company, Fort Gibson, Okla., with $50,000 capital stock, has been incorporated by Connel Rogers, J. W. Hurnett, R. E. Coleman, John B. Smith and William Brown. The plant will be equipped at once.

The Meyers Gas & Oil Company, Tulsa, Okla., with $8,000 capital stock, has been organized by E. R. Meighen of that city and I. B. Meyers, A. F. Mortimer, W. A. Thompson and C. L. Burgwin of Haskell.

Texas

AUSTIN, TEXAS, August 10, 1912.

Cotton being the big money crop of Texas it is natural that the machinery trade should be interested in the condition of that staple. Rains during the last few days have greatly improved the prospects of the crop, and it is now practically assured that the yield will be as large as, if not larger than, last year when the record of approximately 4,200,000 bales was made. Optimistic reports of industrial conditions continue to come from all parts of the State and the Southwest. In Mexico, where kaleidoscopic changes in the situation have been taking place for the last several months, the prospects are believed to be brightening. This is particularly true of the eastern portion of the country where there has been up to this time no revolutionary disturbances. In the Tampico territory the demand for various kinds of American machinery is larger than ever before known. This trade, of course, is confined for the most part to oil drilling and pumping outfits. The steel tankage demand, however, is enormous and has been a very profitable source of business for certain American concerns. There is no indication of a cessation in the erection of steel tankage for storage in the oil fields and at Tampico.

The city of Galveston will soon start the work of laying a duplicate water main across Galveston Bay. Its route will be over the new causeway. Bonds in the sum of $100,000 have been issued for the purpose.

The Planters' Oil Mill Company is installing machinery in its new oil mill at Navasota.

The contract will soon be let by the City Council for the construction of a system of storm sewers at Waco.

J. H. Clark of Victoria is having plans prepared for a system of irrigation that he will construct near Gonzales, for the purpose of irrigating about 100,000 acres of land. It is his purpose to build a dam across the Guadalupe River five miles south of Gonzales which will form a reservoir of large capacity.

The Sherman Cotton Oil Company is installing a plant for the manufacture of wrapping twine. It will be operated in connection with its cotton seed oil mill at Sherman.

The Dallas Cooperage Company, Dallas, contemplates establishing a plant at Nacogdoches for the manufacture of barrels and other cooperage products.

The Young Men's Commercial Club of Nacogdoches is promoting the establishment there of a shuttle block factory.

M. J. Morley of Benson and associates are preparing to build a dam across the San Pedro River, 12 miles below Benson, Ariz., and construct a system of irrigation for reclaiming 15,000 acres of land. The project involves an expenditure of about $150,000.

J. J. McNerney and associates will install a 60-ton reduction mill at their Potrero mine near Casal (Sonora) Mexico. The machinery will have to be hauled by wagon from Casal to the mine, a distance of 35 miles.

I. N. Lanham has completed the installation of a broom factory near Rockdale.

It is announced by L. C. Shattuck, manufacturing director of the Shattuck-Arizona Mining Company, that the work of installing a large smelting plant at Bisbee, Ariz., will be started as soon as the company has decided upon the plans. The site has been selected and is laid off ready for the work.

A company is being organized with $35,000 capital stock at Mart for the purpose of constructing a modern sewer system there.

The Young Men's Business League is arranging for the installation at Palestine, Texas, of a canning factory.

Morris & Co., Chicago, Ill., have been granted a permit to do business by the secretary of state of Texas. The company is preparing to erect a large slaughtering establishment and packing plant at El Paso. It has a capital stock of $600,000.

The City Council of Tampico, Mex., has under consideration the enlargement of its waterworks pumping plant and distributing system.

The Cinco Minas Company contemplates installing a large reduction plant at its mines near Hostotipaquillo, Jalisco, Mex.

The Calhoun Pattern Foundry & Machinery Company has acquired a site fronting on the Houston ship channel for a large foundry and machine shops. Contracts have been let for the erection of three fireproof buildings which are to house the plants.

The United States Smelting & Refining & Mining Company of Boston, which recently acquired an option on the San Pedro Analco Silver mines in the Hostotipaquillo district in the state of Jalisco, Mex., also plans to install a hydroelectric plant near the property. The Negociacion Minera de San Pedro Analco which has given the option constructed a dam across the Santiago River some time ago as a preliminary part of its plans for installing a hydroelectric plant. This dam will be used if the purchase is consummated.

The United Sugar Company contemplates equipping its refinery and mill at Guaymas, Mex., with oil-burning engines.

The Littlejohn Irrigation Company has been organized at Big Wells, Texas, with a capital stock of $160,000 for the purpose of constructing a system of irrigation. The incorporators are W. H. J. Littlejohn of Shreveport, La., William McMurray and Otto S. Dowlin of Big Wells.

The Pacific Coast

PORTLAND, ORE., August 6, 1912.

The outlook for machine tool business is gradually improving, with the projected establishment of small shops and increasing activity among established plants, though current business is still rather light. The steady expansion of the lumber industry, with better prices for the output, have a stimulating effect on the general machinery market, and there is considerable buying for special industrial plants of various kinds. Crop conditions are good, and the implement trade through the interior is extremely active. Highway and contractors' machinery is moving well, and considerable business is resulting from power development projects. Small shipbuilding contracts are more numerous than for several years.

Practically every logging machinery firm operating in the coast market was represented at the Pacific Logging Congress, which met July 25 at Tacoma, Wash., special facilities being provided for machinery exhibits. The application of electricity to logging and sawmill operations was given considerable discussion.

Two good sized steamer repair contracts have been placed with the Seattle Construction & Drydock Company and the Heffernan Engineering Works. J. L. Gibson, who has been with the former concern, is now superintendent of outside construction for the latter.

The steamer Chicago Maru, leaving Tacoma recently for the Orient, carried electrical machinery valued at $65,500.

The Armstrong Mfg. Company, which has operated a small shop in this city for six years, making special types of woodworking machinery, has acquired a 10-acre site on the Oregon Electric Railway near Woodburn, and is preparing to install a fully equipped plant.

The West Coast Wagon Company, Tacoma, Wash., plans to enlarge its shops in the fall.

The Gibraltar Development Company is preparing to install a rock quarry near Hood River, Ore.

A. Welch has taken over a power plant at Winchester, Ore., and will double the capacity at a cost of $20,000.

The Port of Portland opened bids July 30 for an air compressor.

The Elmira Lumber Company is preparing to install a planing mill at Eugene, Ore.

The Portland Bolt & Mfg. Company, Portland, Ore., has been incorporated with a capital stock of $25,000.

The Inland Navigation Company has placed a contract with the Seattle Construction & Drydock Company for a 162-ft. steel steamer, to cost about $100,000.

It is reported that the Brookings Lumber Company of California will install a sawmill and logging outfit in Curry County, Ore.

The Washington Water Power Company is preparing to purchase a lot of machinery for the construction of a concrete dam, etc.

The Jack Waite Mining Company, Wallace, Idaho, is planning to build a concentrating plant.

The Metaline Oriole Mining Company, operating near Metaline, Wash., is making arrangements for the installation of a 50-ton concentrator.

Eastern Canada

TORONTO, ONT., August 10, 1912.

Trade is at the full limit of activity for this season. At the end of one crop year and on the verge of another trade is seldom brisk, but it is now more than brisk. All the skilled labor that is in the country is fully employed. In manufacturing circles there are few strikes at any time nowadays, as nobody can afford to close down when the demand is so pressing.

W. Burton Stewart, vice-president of the Norton Griffiths Company, which has the contract for building great harbor works at St. John, N. B., for the Dominion Government, says that a steel plant to cost between $3,000,000 and $4,000,000 is likely to be established in that city in the early future.

The Guelph Carpet Mills Company, Guelph, Ont., has decided to erect another large addition and the plans for the same are now being drawn.

Work on a new factory for the Dominion Linen Mills Company, Guelph, Ont., is now well under way.

The Canada Steel Goods Company, Ltd., Hamilton, Ont., with capital stock of $600,000, has been incorporated. Connected with it are A. F. Hatch, manufacturer, and Walter S. Stewart, architect, with others. The purpose of the company is to manufacture various metals.

Welland Town, with B. J. McCormick, industrial commissioner, has arranged to take care of factories which want a small area of space and do not care to put up their own buildings at first, by organizing the Welland Terminals, Ltd., which has purchased seven acres of land and will erect a cement building with 50,000 sq. ft. of floor space. The building is so arranged that it can be rented in different sizes to different companies, and electric power, water, gas and heating will be furnished at a low rate by the corporation. This bulding will be erected at once and provision will be made later for increasing the size to 100,000 ft. of floor space.

The St. Thomas Dehydrating Company, St. Thomas, Ont., has been organized with local capital for the purpose of dehydrating and evaporating fruits and vegetables, and a canning factory plant has been purchased from the Canadian Canners. This is the first factory of its kind in Canada, and it is said there is only one in the United States.

Negotiations have been concluded in Brantford, Ont., for the establishment of the Keeton Automobile Company, with a capital stock of $200,000. The firm is a branch of the Keeton Engine Company of New York. It will employ 250 hands and operations will be commenced immediately in the old Barber & Ellis factory on Elgin street.

The Bell Telephone Company has taken out a building permit in London, Ont., and commenced work on a $45,000 addition to its present plant. The new building will be erected at the north of the present building.

Ratepayers of Palmerston, Ont., carried the by-law submitted to its property owners for the establishing of a factory for manufacturing trunks and valises.

A by-law to grant a $5,000 site and a limited fixed assessment for 10 years to the Wood Chemical Company of Canada was voted on by the ratepayers of Belleville and carried. The company has a capital stock of $500,000. Buildings are to be started in three months to cost $150,000.

The Canadian Fairbanks-Morse Company, Ltd., Toronto, has completed arrangements for the issue of $1,000,000 additional preferred stock, of which $400,000 will go into plant enlargement, and the remainder will be available as working capital. Supplementary letters patent have been granted to the company to increase its capital to $3,100,000.

W. W. Woelfle and other local men in Berlin, Ont., have organized a company and will erect a $10,000 building for the purpose of manufacturing shoes there. The factory will be located in the West Ward, where building operations on the Canadian Consolidated Rubber Company's building have commenced.

St. Thomas, Ont., has closed two industrial deals. E. E. Donovan of London will start a shoe factory in return for $12,000 loan, and the Steel Grave Vault Company, Galion, Ohio, will erect a factory there for a free site. The former concern will employ 50 men and the latter 35.

The Mueller Mfg. Company, Decatur, Ill., is putting up a machine shop and brass foundry in Sarnia, Ont.

A manufacturing plant is planned for the Galt Machine Screw Company, Galt, Ont., incorporated with a capital stock of $40,000.

Western Canada

WINNIPEG, MAN., August 8, 1912.

Booking of orders for machinery was not very brisk this week among the local houses, but they are quite busy on business placed previously. The general situation is pretty much the same as reported in the last few reviews. The trade is elated over the encouraging outlook consequent upon the assurance of a good grain crop in every part of the country. The demand for heating machinery will be heavier this fall than in any corresponding period in this country. The volume of building since the first of the year has been unusually large, and a high percentage consists of big apartment blocks, warehouses, office buildings, etc., which must be fitted out with adequate heating facilities. Heating contractors are very busy at the present time.

The Winnipeg Cabinet Factory, Ltd., Winnipeg, has been incorporated with a capital stock of $60,000. The incorporators are Donald Miller, J. M. Cosgrove and E. G. Trick, all of Winnipeg.

The shops of the Canadian Northern Railway in Winnipeg are to be doubled in capacity. The power house is also to be enlarged. Three steam hammers will be added to the blacksmith shop, and proportionate extensions will be made in the other machinery.

The Moose Jaw Tent & Mattress Company, Ltd., is preparing to start in Moose Jaw manufacturing bedsprings and the lines the name indicates.

The Belbeck Farmers & Trading Company will erect a 45,000 bushel grain elevator at Moose Jaw.

The Hammond Stooker Company has signed an agreement with the City Council of Fort William to establish a factory there that will employ 100 men the first year, 200 the second year and 300 the following years.

A by-law is to be submitted to the rate-payers of Nanaimo, B. C., to spend $50,000 on a water works system. The city engineer is A. Waters.

Plans are being prepared for grain elevators to be erected at Vancouver, B. C., by the A. B. C. Elevator & Wharf Company, of which E. H. Heaps, Vancouver, is the president.

The Southern Elevator Company, Ltd., Moose Jaw, has been incorporated, to go into the grain elevator business.

The Hub City Steel Wagon Company, with a capital stock of $300,000, will start a manufacturing business at Saskatoon, Sask., in the near future.

The Shevlin-Clarke Lumber Company, Ltd., Fort Frances, western Ontario, has added extensively to its timber-limit holdings, and is expected to increase the capacity of its mill.

The British Columbia Warehousing Company, Ltd., Vancouver, has been incorporated, to operate flour mills, elevators, etc.

James Richardson & Son, Kingston, Ontario, will erect a large elevator at Fort William.

It is said that the Canada Cement Company's western plant is almost certain to be located at Medicine Hat, Alberta.

Architects are now working on the plant for the McKellar Bedding Company, to be erected in Fort William at an early date. This company will erect on a

site costing not less than $15,000 and the plant itself not less than $75,000.

A contract has been awarded for the erection of a modern cleaning elevator on the industrial spur track system, Fort William, Ont. The new plant is to be operated by the Superior Elevator Company, which is closely associated with the Parrish Lindsay Grain Company of Winnipeg.

Government Purchases

WASHINGTON, D. C., August 12, 1912.

The Paymaster General, Navy Department, Washington, will open bids August 20 under schedule 4726, class 31, for 16 sets steam turbine blowers.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids August 31 for furnishing and delivering one 15-ton locomotive crane at the naval station, Pearl Harbor, Hawaii.

The United States Engineer office, Milwaukee, Wis., will receive bids August 30 for constructing and delivering one composite hull dipper dredge with machinery and fittings complete.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids August 6 for supplies for the navy yards as follows:

Schedule 4689, class 1, two centrifugal air compressors, single state, motor driven—Bidder 28, Connersville Blower Company, New York, $2088; 43, De Laval Steam Turbine Company, Trenton, N. J., $2791; 65, General Electric Company, Schenectady, N. Y., $1885, $1950.

Schedule 4690, class 2, two centrifugal motor-driven blowers—Bidder 28, Connersville Blower Company, New York, $1312; 43, De Laval Steam Turbine Company, Trenton, N. J., $2170; 65, General Electric Company, Schenectady, N. Y., $1020 and $959, alternate.

Class 3, one industrial railway equipped—Bidder 62, R. W. Geldart, New York, $1865; 68, C. W. Hunt Company, West New Brighton, N. Y., $1868; 181, Orenstein-Arthur Koppel Company, Pittsburgh, Pa., $1220 and $956, alternate.

Schedule 4691, class 11, four ash ejector pumps—Bidder 41, M. T. Davidson Company, Brooklyn, N. Y., $1440; 109, Newport News Shipbuilding & Drydock Company, New York, $1655; 166, Warren Steam Pump Company, New York, $1872.

Schedule 4696, class 41, one complete outfit of laundry machinery—Bidder 2, American Laundry Machinery Company, New York, $2482.50, alternate $2155 and $3993.50; 31, Columbia Mfg. Company, Columbia, Pa., $2514.93; 145, Troy Laundry Machinery Company, New York, $2784 and $2775; 152 Universal Supply Company, New York, $2360.

Trade Publications

Motor Drive.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Leaflet No. 3505. Is one of a series of descriptive leaflets on the application of electric motors for paper mill service.

Hydraulic Turbines.—Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 1627. Relates to a line of vertical single, twin and triplex open flume hydraulic turbines which are suitable for direct connection to vertical electric generators. The special features claimed for these turbines are efficiency, reliability and low maintenance, and all of these are briefly touched upon in the bulletin. Power and speed tables for various types are included.

Platform Trucks.—St. Louis Truck & Mfg. Company, St. Louis, Mo., Van Nest Company, 26 Cortlandt street, New York City, sales agent. Folder. Calls attention to a line of steel trucks for freighthouse, warehouse, railroad and steamboat work. One of the special features apart from solid construction is the use of a self-oiling and dust-proof wheel.

Meters.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Pamphlet and nine descriptive leaflets. The pamphlet fully describes the complete line of switchboard meters recently brought out by this company and in addition contains reprints of papers published in the Electric Railway Journal on Modern Tendencies in the Design of Switchboard Indicating Meters and the Theory and Performance of Induction Instruments. The descriptive leaflets which are numbered from 2465 to 2473 inclusive, illustrate the new line of 7 and 9 in. switchboard indicating meters. Each leaflet contains a full size facsimile of the meter dial, the purpose being to present a correct idea of the actual appearance of the meter when installed. By placing these leaflets on the wall, it is possible to gain an accurate idea of the ease of reading the meter from any distance or angle.

Roller Bearings.—Hyatt Roller Bearing Company, Newark, N. J. August number of the Hyatt Way, which is a booklet published once a month in the interest of anti-friction bearings. Contains a number of reproductions of advertisements which have recently appeared in the trade and technical journals, calling attention to the special features of the bearings.

Blowers.—Albert J. Kelting, 459 Carroll street, Brooklyn, N. Y. Catalogue. Size, 6 x 9 in. Gives a comparison of the different methods of moving air for high, low and intermediate pressures and also contains a full description of the Kelting positive pressure blower. This blower is of unique design and operates at a moderate speed without employing any gears. The blast is said to be steady and non-pulsating and as there are no unbalanced moving parts it runs quietly and without vibration. Absence of valves and the small amount of floor space required are two features of the blower which can also be used for vacuum work.

Hack Saw Machines.—W. Robertson Machine & Foundry Company, 32 Greenwood place, Buffalo, N. Y. Circular and folder. Call attention to the Economy line of power hack saw machines. Illustrated descriptions of two of these, the No. 2 and the No. 5 appeared in *The Iron Age*, May 30 and August 1, 1912, respectively.

Rotary Converter and Motors.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Two leaflets. The first, No. 2494, illustrates and describes a synchronous booster rotary converter which consists of a standard converter in combination with a revolving-armature alternating-current generator mounted on the same shaft and having the same number of poles. Leaflet No. 2499 treats of the type QM commutating pole direct-current motors for compressors, pumps and similar classes of service.

Time Recorder.—Calculagraph Company, 9 Maiden Lane, New York City. Pamphlet. Calls attention to the use of the Calculagraph in manufacturing plants to secure accurate cost records and shows the various types of instruments and how they can be employed to give any type of record desired.

Cold Saw Cutting-Off Machines.—Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa. Catalogue No. 47. Size, 6x9 in.; pages, 96. Relates to the line of metal cold saw cutting-off machines built by this company. After a general historical account of the development of this type of machine, the various machines are illustrated and described. Some of the machines covered are a special cold sawing machine for heavy forgings and a 26-in. cold saw cutting-off machine, illustrated descriptions of which appeared in *The Iron Age*, May 2 and 23, 1912, respectively. Mention is also made of some of the other machines built by this company, which include vertical and horizontal milling machines, duplex milling machines and bolt threading and gear cutting machines.

Acetylene Apparatus.—Alexander Milburn Company, 505 West Lombard street, Baltimore, Md. Folder. Calls particular attention to a line of portable acetylene lights, builders' and emergency lights of from 500 to 4000 cp. and its No. 3X light which has a candle power of from 8000 to 12,000. The builders' light is intended for use in tunnels and mines and contractors' and builders' work and will burn for 10 hr. The emergency light is designed for short service and will burn for about 90 min. Mention is also made of a special contractors' oxy-acetylene welding and cutting outfit and a steam acetylene generator.

Motor Cars.—McKeen Motor Car Company, Omaha, Neb. Catalogue. Size, 5½ x 8 in.; pages, 75. Shows the various types of gasoline motor cars for steam branch line and interurban railroad service which this company builds. These cars are built in a number of lengths from 31 to 70 ft., and for various combinations. An interesting feature of the catalogue is the reproduction of photographs of two cars which collided while running at a speed of more than 70 miles per hr.

Valves and Fittings.—Pratt & Cady Company, Hartford, Conn. Catalogue. Size, 6 x 9 in.; pages, 232. This is the company's 1912 catalogue illustrating and describing briefly the line of valves, hydrants, asbestos packed and corporation cocks, couplings, etc., for all purposes. The catalogue is divided into eight sections, each of which deals with some particular branch of the line. Dimensions of the different valves and fittings are given in connection with the illustrations and in addition there is a 43-page set of tables of dimensions of the various valves. A complete telegraphic code and an index are also included.

Sump Pump.—Goulds Mfg. Company, Seneca Falls, N. Y. Bulletin No. 111. Illustrations and descriptive matter explain the operation of a centrifugal sump pump which has the motor mounted at the top, thus making it a self-contained unit. An illustrated description of this pump, together with a belt-driven type, appeared in *The Iron Age*, August 1, 1912.

Cotter Pin.—A. C. Campbell, Waterbury, Conn. Folder. Lists the various sizes of Campbell cotter pin which is self-spreading and is locked in place automatically by a blow of the driving hammer. An illustrated description of this pin with an account of its development appeared in *The Iron Age*, August 1, 1912.

Drill Sharpeners.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 4018. Relates to the use of the Leyner drill sharpeners and is made up almost entirely of testimonial letters received from users and photographs of the installations referred to therein. These machines are made in three sizes for pneumatic operation and brief specifications of each are included.

Valves, Pipes and Pipe Fittings.—Pittsburgh Piping & Equipment Company, Thirty-fifth, Charlotte and Smallman streets, Pittsburgh, Pa. Collection of loose leaf blueprints. Gives the company's standard dimensions of pipe fittings, valves and special work as well as a number of useful tables for engineers. All of these are numbered and an index in the front renders it easy to locate any desired table. A number of sheets of ruled sketching paper are also included.

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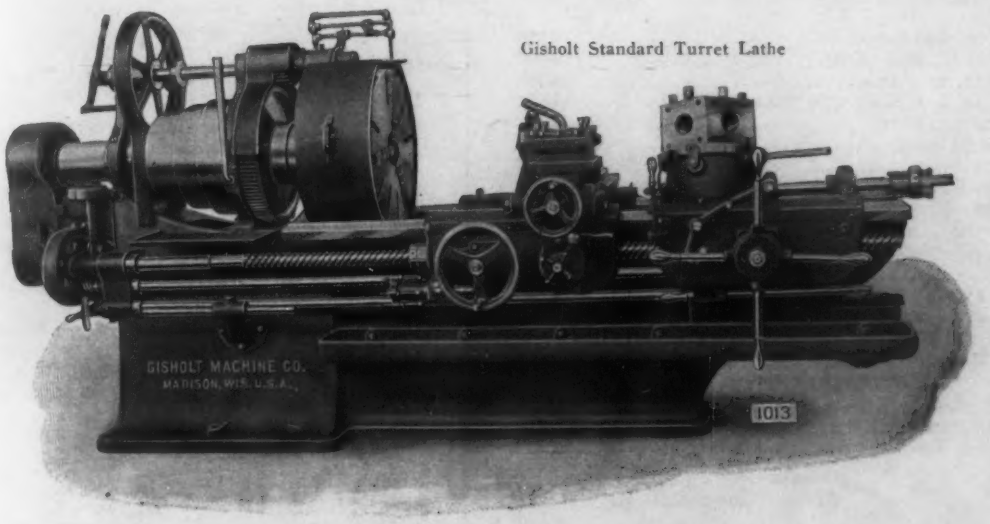

Gisholt Standard Turret Lathe

We "Pay the Freight" on our Engineering Service. So why not have a talk out in your own shop with one of our trained field engineers? At the worst it couldn't harm you while it might—Well at least there are possibilities worth considering. *Write right now —you never will regret it.*

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New York Office—50 Church Street, New York City

Foreign Agents:—Alfred H. Schutte, Cologne, Berlin, Brussels, Liege, Paris, Milan, Bilbao, Barcelona. Donauwerk Ernst Krause & Co., Vienna, Prague and Budapest. C. W. Burton Griffiths & Co., London, England. Andrews & George, Yokohama, Japan.

Current Metal Prices

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impracticable to name every size.

The wholesale prices, at which large lots are sold by manufacturers for direct shipment from mills, are given in the market reports appearing in a preceding part of *The Iron Age* under the general heading of "The Iron and Metal Markets."

IRON AND STEEL

Bar Iron and Soft Steel Bars

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square	1.80c
1½ to 4 in. x ⅜ to 1 in.	1.80c
1½ to 4 in. x ¼ to 5/16 in.	2.00c
Burden's H. B. & S. bar iron, base price	3.12c
Burden's Best bar iron, base price	3.15c
Norway bars	3.50c
Soft steel:	
¾ to 3 in., round and square	1.90c
1 to 6 in. x ⅜ to 1 in.	1.90c
1 to 6 in. x ¼ and 5/16 in.	2.05c
Rods—⅝ and 11/16 in.	2.00c
Bands—1½ to 6 x 3/16 to No. 8	2.20c

Shapes

Beams and channels—3 to 15 in.	2.05c
Angles:	
3 in. x ¼ in. and larger	2.05c
3 in. x 3/16 in. and ⅛ in.	2.40c
1½ to 2½ in. x ⅛ in.	2.15c
1½ to 2¾ in. x 3/16 in. and thicker	2.05c
1 to 1¼ in. x 3/16 in.	2.15c
1 to 1¼ x ⅛ in.	2.20c
⅞ x ⅛ in.	2.30c
¾ x ⅛ in.	2.35c
⅝ x ⅛ in.	3.55c
½ x 3/32 in.	4.60c
Tees:	
1 in. x 1 x ⅛ in.	2.45c
1¼ in. x 1¼ in. x 3/16 in.	2.30c
1½ to 2½ x ¼ in.	2.10c
1½ to 2½ x 3/16 in.	2.20c
3 in. and larger	2.10c

Merchant Steel

Bessemer machinery	1.90c
Tire, toe calk, and sleigh shoe	1.90@3.00c
Best cast steel, base price in small lots	7c

Sheets

Black.	One pass, C. R. soft steel.	R. G. cleaned.
No. 14	Per lb. 2.35c	2.95c
No. 16	Per lb. 2.45c	3.05c
Nos. 18 to 20	Per lb. 2.50c	3.15c
Nos. 22 and 24	Per lb. 2.55c	3.25c
No. 26	Per lb. 2.60c	3.35c
No. 27	Per lb. 2.65c	3.45c
No. 28	Per lb. 2.70c	3.55c
No. 29	Per lb. 2.90c	—
No. 30	Per lb. 3.10c	—

Russia, Planished, &c.

Genuine Russia, according to assortment.. Per lb. 12@14½c
Patent planished, W. Dewees Wood. Per lb. A. 10c; B. 9c net

Galvanized.

Nos. 12 and 14	Per lb. 2.90c
No. 16	Per lb. 3.00c
Nos. 18 and 20	Per lb. 3.15c
Nos. 22 and 24	Per lb. 3.25c
No. 26	Per lb. 3.45c
No. 27	Per lb. 3.60c
No. 28	Per lb. 3.75c
No. 30	Per lb. 4.15c

No. 20 and lighter, 36 inches wide, 25c higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c per 100 lb. over flat sheets.

Corrugated Roofing, Painted

2½ in. corrugation.

No. 22	Per 100 sq. ft.. $4.75
No. 24	Per 100 sq. ft.. 3.75
No. 26	Per 100 sq. ft.. 2.85
No. 28	Per 100 sq. ft.. 2.50

Genuine Iron Sheets

Galvanized.

Nos. 22 and 24	Per lb. 5.50c
No. 26	Per lb. 6.25c
No. 28	Per lb. 7.00c

Tin Plates

American Charcoal Plates

AAA charcoal:	
IC 14 x 20	$6.45
IX 14 x 20	7.70
A charcoal:	
IC 14 x 20	$5.40
IX 14 x 20	6.50

American Coke Plates—Bessemer.

IC 14 x 20, 107 lb.	$4.30
IX 14 x 20	5.30

American Terne Plates.

	Per box
IC 20 x 28 with an 8-lb. coating	$8.30
IX 20 x 28 with an 8-lb. coating	10.30

Seamless Brass Tubes

List November 13, 1908. Base price, 21c

Brass Tubes, Iron Pipe Sizes

List November 13, 1908. Base price, 21c

Copper Tubes

List February 1, 1911. Base price, 25c

Brazed Brass Tubes

List February 1, 1911. Base price, 22⅞c

High Brass Rods

List February 1, 1911. Base price, 18c

Roll and Sheet Brass

List February 1, 1911. Base price, 18¼c

Brass Wire

List March 30, 1911. Base price, 18c per lb.

Copper Wire

Base price, Carload lots mill, 19c

Copper Sheets

Sheet copper hot rolled, 16 oz. (quantity lots), Base price, per lb., 22c.

Sheet copper cold rolled, 14 oz. and heavier, 1c per. lb. advance over hot rolled.

Sheet copper polished, 20 in. wide and under, 1c per sq. ft.

Sheet copper polished, over 20 in. wide, 2c per sq. ft.

Planished copper, 1c per sq. ft. more than polished.

Tinning, one side, 3½c per sq. ft.

METALS

Tin

Straits pig ..... Per lb. 49 @50 c

Copper

Lake ingot	Per lb. 19¼@19¾c
Electrolytic	Per lb. 19 @19½c
Casting	Per lb. 18¾@19¼c

Spelter

Western ..... Per lb. 8 @ 8¼c

Zinc

No. 9 base, casks....Per lb. 9.25c Open....Per lb. 9.75c

Lead

American pig	Per lb. 5¼@ 5½c
Bar	Per lb. 6¾@ 7 c

Solder

½ & ½, guaranteed	Per lb. 29½@30 c
No. 1	Per lb. 27½@28 c
Refined	Per lb. 25 @25½c

Prices of solder indicated by private brand vary according to composition.

Antimony

Cookson's	Per lb. 10¼c
Hallet's	Per lb. 10 c
Other brands	Per lb. 9@9½c

Bismuth

Per lb. ..... $2.00@$2.25

Aluminum

No. 1 aluminum (guaranteed over 99 per cent. pure), in ingots for remelting (ton lots)....f.o.b. mill, 21½@23c
In 100 lb. lots 25c

Old Metals

Dealers' purchasing prices paid in New York are as follows:

	Cents per lb.
Copper, heavy and crucible	14.75
Copper, heavy and wire	14.50
Copper, light and bottoms	13.00
Brass, heavy	8.75
Brass, light	7.00
Heavy machine composition	11.75
Clean brass turnings	9.00
Composition turnings	10.50
Lead, heavy	4.15
Lead, tea	3.00
Zinc, scrap	5.25

A
Handful
of
Favorites

Get Longest Wear for Lowest Cost

The expense per year of service is the only true test for judging your File cost.

It discloses the absolute superiority of NICHOLSON Files. That is why in the finest manufacturing plants, where costs are carefully computed, these files are almost invariably used. Both buyers and workmen know that

Nicholson Files Give the Best Service

Each step in their making is guarded by the rigid inspection of experts. *Every* file is tested for soundness, temper, and cutting qualities before it is boxed and sealed.

This same high standard has been maintained for nearly half a century. A personal pride is felt in keeping NICHOLSON Files the best that brains can make or money buy.

Leading dealers in almost every town sell genuine NICHOLSON Files. If your dealer can't furnish you, tell us at once, and we will see that you do get them.

Nicholson File Company

Providence, R. I.

FOR YOU

A forty-eight years' education on files in an hour. It's all in our booklet, "FILE FILOSOPHY." Sent FREE on request.

NICHOLSON
U.S.A.
(Trade Mark)

Mill and Machinists' Supplies

These prices are for small lots and are obtained from dealers

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in Roman relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

ANVILS—AMERICAN—

Eagle Anvils ..... ℔ @9 ¢
Hay-Budden, Wrought ..... 9½@9¾¢
Star ..... ℔ doz. $13.80
Trenton ..... ℔ lb 9½@9¾¢

Imported—

Swedish Solid Steel Paragon, ℔ lb....9½@9¾¢
Peter Wright & Sons, ℔ lb, 80 to 349 lb, 10½¢
350 to 600 lb, 11¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00 ..... 15&10%

AXLES—

Iron and Steel—

Concord, Loose Collar ..... 4¼@4½¢
Concord, Solid Collar ..... 4½&5 ¢
No. 1 Common, Loose ..... 3½@4 ¢
No. 1½ Com., New Style ..... 4¼@4¾¢
No. 2, Solid Collar ..... 4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12 ..... 70%
Nos. 13 to 14 ..... 70%
Nos. 15 to 18 ..... 70&10@70&10&5%
Nos. 19 to 22 ..... 70&10@70&10&5%

Boxes, Axle—

Common and Concord, not turned..lb.,5@6¢
Common and Concord, turned.....lb.,6@7¢
Half Patent ..... lb.,9½@10¢

BARS—CROW—

Steel Crowbars, 10 to 40 lb., per lb.....2¾¢

BELLOWS—

Blacksmith, Standard List:
Split Leather ..... 60@60&5%
Grain Leather ..... 40@40&10%

Hand—

Inch	6	7	8	10	
Doz.	$4.00	5.50	6.50	7.00	Net Prices

Molders—

Inch	10	12	14	16	
Doz.	6.75	9.00	11.50	16.50	

BELTING—LEATHER—

From No. 1 Oak Tan Butts

Extra Heavy, Single and Double....50@50&5%
Heavy, Single and Double.....50&10&5@60%
Medium, Single and Double..60&10@60&10&5%
Shoulder, Single and Double.....70@70&10%
Standard ..... 60&10@60&10&5%
Cut Leather Lacing, Strictly No. 1....40@50%
Leather Lacing Sides, per sq. ft. Raw Hide,
No. 1, in sides 17 sq. ft. and over....26@27¢
Under 17 sq. ft..... 24@25¢

Rubber—

Competition (Low Grade).....70&5@70&10%
Standard ..... 60&10@60&10&10%
Best Grades ..... 40&10@50%

BENDERS AND UPSETTERS, TIRE—

Green River Tire Benders and Upsetters....20%

BLOCKS—TACKLE—

Common Wooden ..... 75&5%
Lane's Patent Automatic Lock and Junior..30%
See also Machines, Hoisting.

BOLTS—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller.....75&10&2½%
Larger and Longer..... 70&10%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter..... 80%
Phila. Eagle, $3.00 list..... 75&10%
Bolt Ends, with C. & T. Nuts..... 75%
Machine (cut thread):
⅜ x 4 and smaller..... 75&2½%
Larger and longer..... 70%

Expansion—

F. H. Evans' Crescent..... 40@60%
Richards-Wilcox Mfg. Co..... 60&10%
A. C. Seaman's Positive..... 60&10%
Star Expansion Bolt Co.:
Star Lag Screw Type..... 50&10&10%
Star, and Sebco, Wood Screw Type..... 50%
Star Machine, Single..... 50&10%
Star Machine, Double..... 50&10%
Sebco Toggle Bolts..... 50&10%
Steward & Romaine Mfg. Co.:
Style No. 13 Double Machine..... 70%
Style No. 1, Single Machine..... 70%
Style No. 100, Double Jaw, Single..... 60%
Lag Screw Type..... 66⅔%
Screw Anchors 60%

Tire—

Common Iron ..... 80@80&10%
Norway Iron 80%
American Screw Co.:
Norway Phil., list Oct., '84..... 80%
Eagle Phil., list Oct. 16, '84..... 82½%
Bay State, list Dec. 28, '99..... 80%
Franklin Moore Co.:
Norway Phil., list Oct. 16, '84..... 80%
Eagle Phil., list Oct. 16, '84..... 82½%
Eclipse, list Dec. 28, '99. ..... 80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99..... 80%
Norway Phil., list Oct., '84..... 80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99..... 80%
Phil., Eagle, list Oct. 16, '84..... 82½%
Upson Nut Co.:
Tire Bolts ..... 75&10&5%

CALKS, TOE AND HEEL—

Blunt, 1 prong, per 100 lb.....$3.80@$4.00
Sharp, 1 prong, per 100 lb.....$4.30@$4 50
Perkins', Blunt, ℔ lb., 3.65¢; Sharp....4.25¢

CHAIN, PROOF COIL—

Small lots, New York.

American Coil Straight Link—

3-16	¼	5-16	⅜	7-16	½&9-16	⅝	¾	⅞	1 to 1¼
$7.60	5.05	4.05	3.50	3.30	3.15	3.00	2.90	2.80	2.70

Genuine German Coil..... 70%
American, German Pattern Coil:
6/0 to 2/0..... 80%
1/0 ..... 75@75&10%
1, 2, 3..... 70@75%
4 ..... 65&10@70%
5, 6 ..... 60&10@65%

Trace, Wagon, &c.—

Traces, Western Standard:	*100 pr.*
6½—6-3, Straight, with ring	$26.00
6½—6-2, Straight, with ring	$27.00
6½—8-2, Straight, with ring	$32.00
6½—10-2, Straight, with ring	$38.00

NOTE.—Add 2¢ per pair for Hooks Twist Traces add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of Straight Link. Eastern Standard Traces, Wagon Chain, &c. ..... 70&10@—%

Miscellaneous—

Jack Chain:
Iron ..... 60&10%
Brass 50%
Safety and Plumbers' Chain..70&10@70&10&5%

CHESTS, TOOL—

American Tool Chest Co.:
Farmers', Carpenters', etc., Chests with Tools 20%
Tool Cabinets, with Tools..... 45%
Machinists' and Pipe Fitters' Chests, Empty 45%
Steel Tool Chests, Empty..... 20%
C. E. Jennings & Co.'s Machinists' Tool Chests 20%

CHISELS—

Cold—

Cold Chisels, good quality.....13@15¢
Cold Chisels, fair quality.....11@12¢
Cold Chisels, ordinary.....9@10¢

CHUCKS—

Almond Drill Chucks..... 35%
Beach Pat. each $8.00..... 35&5%
Jacobs' Drill Chucks..... 30%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws..... 35%
Universal, Com. Style Jaws..... 40%
Combination, Reversible Jaws..... 35%
Combination, Com. Style Jaws..... 40%
Round Body or Box Body, 2 Jaw Chuck..25%
Geared Scroll Chucks..... 25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%
Positive Drive 35%
Planer Chucks 20%
Standard 45%
Drill Press Vise..... 30%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck 40%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; Nos. 21 and 24..... 35%
Scroll Combination, Nos. 83 and 84....30%
Geared Scroll, Nos. 79, 80 and 81..... 25%
Independent Iron, Nos. 118, 19, 318 and 96.35%
Independent Steel, No. 64..... 25%
Union Drill 30%
Union Czar Drill..... 30%
Universal, Nos. 21 and 42..... 35%
Iron Face Plate Jaws, Nos. 48 and 50...35%
Steel Face Plate Jaws, Nos. 70 and 72..30%
Westcott Patent Chucks:
Lathe Chucks 40%
Little Giant Auxiliary Drill..... 40%
Little Giant Double Grip Drill..... 40%
Little Giant Drill, Improved..... 40%
Oneida Drill 40%
Scroll Combination Lathe 40%

CLAMPS—

Hammer & Co.:
Adjustable ..... 20&5%
Carriage Makers' H. P. Screw..... 40&5%
Myers', Standard and Wenzelmann Hay Rack. 50%

CLIPS, AXLE—

Regular Styles..... 80@80&10%

COMPASSES, DIVIDERS, &c.—

Ordinary Goods..... 75&5@80%

COPPERS, SOLDERING—

Soldering Coppers, 3 lb. to pair and heavier, 24½¢
Lighter than 3 lb., per pair..... 27½¢

CRAYONS—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00, according to grade.
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible..... $7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black $4.50
Giant Lumber, 5¼ in. x 15/16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks $10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.00; 5 in. x ¼ in. Square, $1.50; 5 x ½ x 3/16, $1.75; 5 x 1¼ x 3/16..... $2.50
Suremark, Black, $2.25; Blue, Red and Yellow $2.50

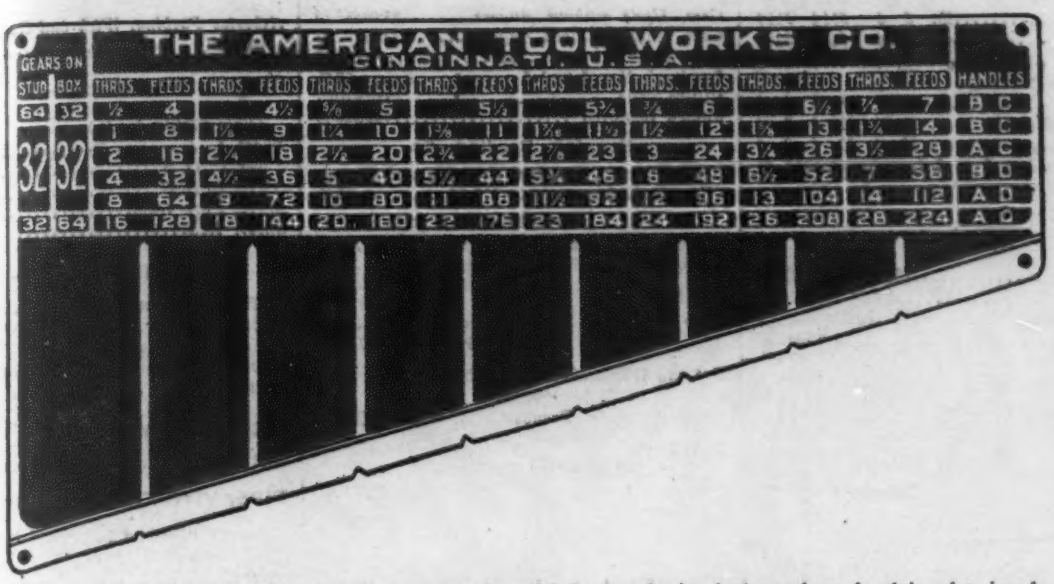
DRESSERS, EMERY WHEEL—

Sterling Emery Wheel Dressers..... 35%
Sterling Wheel Dresser Cutter..... 35%

DRILLS AND DRILL STOCKS—

Blacksmith's Common Drilling Machines..$175
Breast, Millers Falls..... 15&10%
C. & C. Reversible Ratchet Die Stocks....25%
Forbes Die Stocks..... 5%
Goodell Automatic Drills.....50&10@60&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2..... $8.10
Millers Falls Automatic Drills ℔ doz., Nos. 3 & 5, $8.16; 4 & 7, $9.33; 6..... $9.90
Noyes Repair Shop Drill No. 10.. ..... 20%
Ratchet, Parker's 40%
Star Drills and Facut 60%

Unlimited in Range

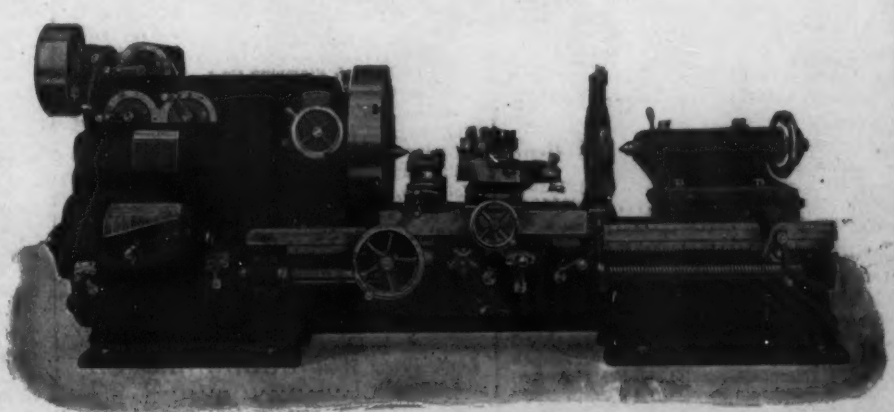

THE AMERICAN TOOL WORKS CO.
CINCINNATI, U.S.A.
GEARS ON STUD
GEARS ON BOX
THRDS. FEEDS THRDS. FEEDS THRDS. FEEDS THRDS. FEEDS THRDS. FEEDS THRDS. FEEDS THRDS. FEEDS HANDLES
64 32 ½ 4 4½ 5/16 5 5½ 5¾ ¾ 6 6½ ⅞ 7 B C
1 8 1⅛ 9 1¼ 10 1⅜ 11 1⅝ 11½ 1½ 12 1⅝ 13 1¾ 14 B C
32 32 2 16 2¼ 18 2½ 20 2¾ 22 2⅞ 23 3 24 3¼ 26 3½ 28 A C
4 32 4½ 36 5 40 5½ 44 5¾ 46 6 48 6½ 52 7 56 B D
8 64 9 72 10 80 11 88 11½ 92 12 96 13 104 14 112 A D
32 64 16 128 18 144 20 160 22 176 23 184 24 192 26 208 28 224 A D

Index plate showing the simple manner in which the desired thread or feed is obtained.

The Thread Cutting and Feeding Mechanism of

"American" High Duty Lathes

is *Direct Reading* and *Unlimited in Range*



"American" 36 in. and 42 in. High Duty Lathe.

THE Quick Change Gear Mechanism is of the Cone and Tumbler type. Changes can be made instantly by shifting the tumbler lever. The Cone and Tumbler Gears are cut from **Special High Carbon Drop Forgings** with Brown & Sharpe 20 degree Involute cutters, which form a tooth pointed at the top and thick at the bottom. Experience has proven this tooth to be the most satisfactory for a tumbler gear mechanism, for it permits of the instantaneous engagement of the gears without clashing, while running at high speed.

There is no speeding up of this mechanism to cut coarse threads or feeds. This feature is especially valuable, as it eliminates the complicated gearing, strain and loss of power, common to other quick change mechanisms, which must be speeded up to cut the coarse threads and feeds.

In addition to the regular range, as shown on the above index plate, any thread or feed can be obtained by simply applying the correct gear or gears to the quadrant on the end of the bed.

We can furnish any special gear required for cutting odd or metric threads.

Write for circular No. 80, which gives more information. Also let us send you our new booklet entitled, "Lathe Efficiency."

The American Tool Works Co.

Lathes ***Planers*** **Cincinnati, Ohio** ***Shapers*** ***Radials***

168

Star Drill Holders....70%
Star Drill Points....60&10%

Twist Drills—

Bit Stock....70&5@70&10%
Taper and Straight Shank....65&10@65&10&5%

EMERY, TURKISH—

		4 to 46:	54 to 220:	Flour
Kegs	lb.	5 ¢	5½¢	3½¢
½ Kegs	lb.	5¼¢	5¾¢	3¾¢
¼ Kegs	lb.	5½¢	6 ¢	4 ¢
10-lb. cans, 10 in case		6½¢	7 ¢	6 ¢
10-lb. cans; less than 10		10 ¢	10 ¢	8 ¢
Less quantity		10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

FILES—

Domestic—

Best Brands....70&10@70&10&10%
Standard Brands....80&5@80&10&5%
Lower Grade....80&5@80&10%
American....75&10%
Arcade....75&10%
Black Diamond....70&10%
Delta Brand....70%
Disston's Superfine....50%
Eagle....75&10%
Fitchburg....75&10%
Great Western....75&10%
Heller Bros....70&10@70&10&10%
Kearney & Foot....75&10%
Liveright Bros. Gold Medal....70%
Liveright Bros. Blue Ribbon....70%
McClellan....75&10%
Nicholson....70&10%
Simonds....70%
J. Barton Smith....75&10%
Toolmakers' "American Swiss"....40&10%
X-F Swiss Pattern....40&10%

FIXTURES, FIRE DOOR—

Richards-Wilcox Mfg. Co.:
No. 102, Monarch A; No. 201, Mutual....50&10%
Universal, No. 103; Special, No. 104....$3.75
Fusible Links, No. 96....50%
Expansion Bolts, No. 107....60&10%

Grindstone—

Net Prices:

Inch	15	17	19	21
Per doz.	$3.00	3.25	3.55	4.00

Reading Hardware Co....50&10%

GASKETS—

Akron Metallic Gasket Co.:
Corrugated Copper....75@10%

GAUGES—

Marking, Mortise, &c....50@50@10%
Chapin-Stephens Co.:
Marking, Mortise, &c....50@50&10%
Disston's Marking, Mortise, &c....60&10%
Wire, Brown & Sharpe's....33⅓%
Wire, Morse's....25%

GRINDERS—

Luther Grinder Mfg. Co.:
Dimo-Grit: each
No. 44 (Fire Fly, No. 4)....$1.05
No. 44½ (Fire Fly, No. 6)....$1.40
No. 14 (Mechanic Special, No. 4M)....$1.40
No. 15 (Mechanic Special, No. 5M)....$2.10
No. 16 (Mechanic Special, No. 6M)....$3.15
No. 17 (Mechanic Special, No. 7M)....$4.00
No. 18 (Mechanic Special, No. 8)....$4.50
No. 18X (Mechanic Special, No. 8X)....$5.00
No. 19 (Mechanic Special, No. 11)....$7.59
No. 55 (Best Maide, No. 1)....$3.05
No. 63 (Farm Special, No. 3)....$6.40
No. 83 (Spartan)....$2.85
No. 271 (New Hummer)....$9.00
Pike Mfg. Co.:
Enclosed Gear Machines: Peerless Senior, Junior and Midget....33⅓%
Chain Driven Machines: Nos. 1, 2, 3 and Pyko Field Grinder 33⅓; Pyko Spiral (Foot Power)....33⅓%
Redlinger & Angle Mfg. Co.:
Climax Steel Frame Emery Grinder, No. 5, $7.00
Star Wooden Frame Emery Grinder....$5.00

GRINDSTONES—

Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00....33⅓%
Richards-Wilcox Mfg. Co., Victor, Cycle, King, Velox, Challenge, Climax, Ell Nos. 011, 014, Ball Bearing, mounted....30%

HAMMERS—

Heavy Hammers and Sledges—

6 to 5 lb. 40....75&10&5@80&10%
Over 5 lb., 30....80&10@80&10&10%

JACKS—

Wagon—

Lanes' Steel....30&5%
Richards-Wilcox Mfg. Co.:
Richards' Tiger Steel, No. 130....50&10%
Wilcox Steel No. 228—1, $5.75; 2, $7.00; 3, $12.85; 4, $28.50.

MACHINES—

Boring—

Com. Upr't without Augers....$2.00@2.25
Com. Angl'r without Augers....$2.25@2.50
Ford Auger Bit Co....$20.00
Jennings', Nos. 1 and 4....25%
Millers Falls....15&10%
Swan's Improved....40&10%

Forming, Bending, &c.

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $15.00....40%

Hoisting—

Moore's Anti-Friction Chain Hoist....30%
Moore's Cyclone High Speed Chain Hoist....25%

NAILS—

Wire Nails and Brads, Miscellaneous....85&10&10@85&10&10&5%

Cut and Wire. See Trade Report.

Horse—

Jobbers' Special Brands....per lb., 8@9½¢

NUTS—

Blank or Tapped—

Cold Punched: Off list.
Square....5.5¢
Hexagon....5.9¢
Square, C. T. & R....6.0¢
Hexagon, C. T. & R....7.0¢
Hot Pressed:....Off list.
Square....6.0¢
Hexagon, ½ in. and smaller....7.8¢
Hexagon, 9/16 and larger....7.0¢

OAKUM—

In 50-lb. Bales.
Best....lb., 6¢
U. S. Navy....lb., 5½¢
Navy....lb., 4½¢
Plumbers' Spun Oakum....lb., 2¼¢

OILERS—

Steel, Copper Plated....80@80&10%
Chase or Paragon:
Brass and Copper....45@50%
Zinc....70%
Railroad....60&10&10%
American Tube & Stamping Co.:
Spring Botom Cans....75&5@80%
Railroad Oilers, &c....70@70&10%
Hero Mfg. Co.:
Spring Bottom Cans....75&5@80%
Railroad Oilers, &c....60@60&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4.50%

OILS—

Animal, Fish and Vegetable—

Linseed, raw, carload lots....65¢
City, five-bbl. lots and over....67¢
Out-of-town, five-bbl. lots and over....66¢
Boiled, 1¢ ℔ gal. advance on Raw.
Lard, Prime Winter....86 @90
Extra No. 1....60 @65
No. 1....53 @55
Cotton-seed, Crude, f.o.b. mill.... @39
Summer, Yellow, prime....6.40@6.45
Summer, white.... 6½@ 7¼
Yellow, Winter.... 6¾@ 7¼
Tallow, Acidless....62 @63
Menhaden, Brown, Strained....31 @32
Northern Crude....24 @28
Southern, f.o.b. Baltimore....22 @24
Light, Strained....32 @33
Bleached, Yellow....36 @38
Bleached, Winter, White....38 @40
Cocoanut, Ceylon, spot.... 8⅝@ 8¾
Copra, spot.... 8½@8⅝
Cochin, spot.... 9¾@10
Cod, Domestic, Prime....46 @48
Newfoundland....49 @51
Corn....5.80@ 5.85
Porpoise, body....50 @60
Olive, in bond....72 @80
Neatsfoot, Prime....62 @70
Palm, Lagos....spot, per. lb..6.50@ 7.00
Soya Bean, English, spot bbls.... 6⅜@ 6¾

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	12 @12½
29 gravity, 15 cold test	12½@13
Summer	11½@12
Cylinder, light filtered	19½@20
Dark, filtered	17 @17½
Paraffine, 903-907 sp. gravity	13½@14
903 sp. gravity	12½@13
883 sp. gravity	10 @10½
Red Paraffine	12½@13

PACKING—

Asbestos Packing, Wick and Rope, any quantity....14@16¢

Rubber—

(Fair quality goods.)
Sheet, C. I....11@12¢
Sheet, C. O. S....11@12¢
Sheet, C. B. S....12@13¢
Sheet, Pure Gum....40@45¢
Sheet, Red....40@50¢

Miscellaneous—

American Packing....lb. 8½@ 9 ¢
Cotton Packing....lb. 16 @25 ¢
Italian Packing....lb. 9 @10 ¢
Jute....lb. 3¼@ 3½¢
Russia Packing....lb. 9 @10 ¢

PICKS AND MATTOCKS—

List....75&10@80%

PIPE, VITRIFIED SEWER—

Standard Pipe and Fittings, 3 to 24 in., Carload lots, f.o.b. factory:
First-class....85%
Second-class....87½

PLATES—

Felloe....lb. 3¼@4¢

PLIERS AND NIPPERS—

Button Pliers....75&10@80%
Gas Burner, per doz., 5 in., $1.25@$1.30; 6 in., $1.45; $1.50.

Gas Pipe	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers....50%
Cronk & Carrier Mfg. Co.:
American Button....80%
Improved Button....75&10%
Cronk's....60%
No. 80 Linemen's....50%
Stub's Pattern....45%
Combination and others....33⅓%
Heller's Farriers' Nippers, Pincers and Tools, 40@40&10%

RASPS, HORSE—

Delta Brand....70%
Disston's....75%
Heller Bros....75@75&10%
Liveright Bros.' Gold Medal....70%
McCaffrey's American Standard....60&10@75%
Nicholson....70&10@75%
See also Files.

RIDDLES, HARDWARE GRADE—

16 in....per doz., $2.50@$2.75
17 in....per doz., $2.75@$3.00
18 in....per doz., $3.00@$3.25
For galvanized, add 50¢ per doz.

RIVETS—

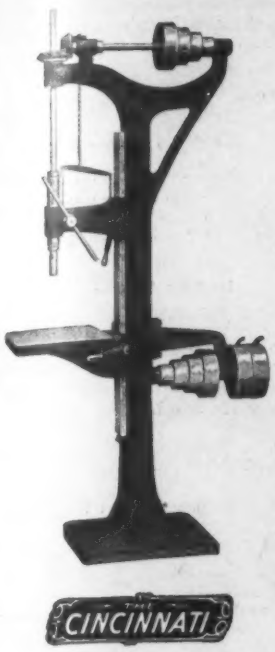
Copper Rivets and Burrs....40&10%
Tinners' and Miscellaneous Rivets..75&5@80%
Structural, base, ¾-in. and larger..$2.10@$2.50
Boiler cone head, ¾-in. and larger..$2.20@$2.60

Bifurcated and Tubular—

Assorted in Pasteboard Boxes.
Bifurcated, per dozen boxes, 50 count, 40@45¢; 100 count, 50@63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

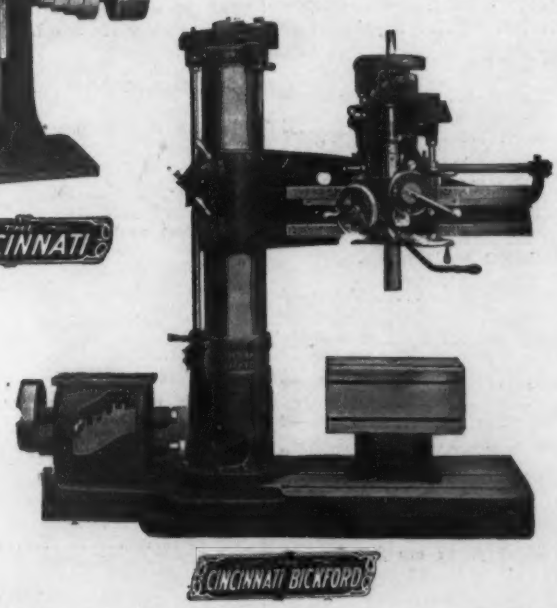
ROPE—

Per Pound.
Eastern Retail Trade.
Manila, 7-16 in. diam. and larger:
Highest Grade....10¢
Second Grade....9¢
Hardware Grade....8¢
Sisal, 7-16 in. diam. and larger:
Higest Grade....7¼¢
Second Grade....6½¢



Our Engineers Will Solve Your Drilling Problems

without cost or obligation. For over forty years we have specialized in the designing and building of drilling machinery. Our experience not only as actual manufacturers, but from our personal contact with the problems of so many other manufacturers, enables us to give you advice relative to the latest improved methods of economic, accurate production.



Advise us what your requirements are, let us see samples if possible, and we will supply you with specific data as to how you can effect appreciable savings in turning out the work.

Cincinnati Upright and Cincinnati Bickford Radial Drilling Machines meet all present-day requirements.

For range of work, rigidity, accuracy and speed they are unexcelled.

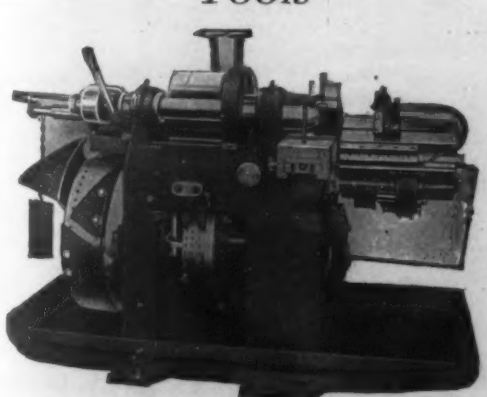
Put your drilling problems up to us—Now!

The Cincinnati Bickford Tool Company

Oakley, Cincinnati, Ohio, U.S.A.

With Gridley Automatic Turret Lathes

There is no Overhang to the Tools



Automatic Turret Lathe—Single Spindle

THIS "No Overhang" feature gives Gridley operators a decided advantage, as it permits a better design of turning tools to be used and also permits drills to be more rigidly supported and held closer to the work. A more accurate product is always the result. But this exclusive feature accomplishes more than that, it allows ample room to attach one tool back of another; that is why Gridley operators frequently do at one operation the same work that requires two or more operations on any other turret lathe. Not only is the output greater, because heavier feeds and coarser cuts can be taken, but a much wider range of work can be handled, simply because there is sufficient room to attach the necessary tools that cannot be used on other automatic turret lathes.

Gridley Automatics will handle work twice the length that other machines can. Made in both Single and Multiple Spindle. Send for Catalogue.

Windsor Machine Co.

Windsor, Vt., U. S. A.

OFFICES AND REPRESENTATIVES: MANNING, MAXWELL & MOORE, INC., Agents for United States and Canada. Office for Great Britain, France, Belgium and Switzerland, 68 Avenue de la Grande Armee, Paris. J. RYAN, Manager. FOREIGN AGENTS: CRAVEN BROTHERS, LTD., Manchester, England, Great Britain and Colonies. CHARLES CHURCHILL & CO., LTD., London, Birmingham, Manchester and Newcastle-on-Tyne, England, and Glasgow, Scotland. M. KOYEMANN, Charlottenstrasse 112, Dusseldorf, Germany, Austria-Hungary, Italy, Switzerland, Norway, Sweden. SCHUCHARDT & SCHUTTE, Norway, Sweden, Russia, China, Japan.

Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Pure ..... 7¼¢
Sisal, Tarred, Medium Lath Yarn:
Pure ..... 6½@ 6¾¢
Cotton Rope:
Best 5-16-in. and larger ..... 19½@20¢
Medium, 5-16-in. and larger ..... 17½@18½¢
Common, 5-16-in. and larger ..... 16¢
In coils, ½¢ advance.
Jute Rope:
Rove, ¼-in. and up
No. 1, 6½@7¢; No. 2, 6@6½¢

Wire Rope—

Galvanized ..... 42½&5%
Plain ..... 50&5%

RULES—

Boxwood ..... 60&10&5%
Ivory ..... 25&5@30%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 50@50&10%
Stephens' Combination 55%
Stationers' ..... 50@50&10%
Keuffel & Esser Co.:
Folding Wood ..... 35&10%
Folding, Steel 33⅓%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood ..... 60&5%

SCALES—

Union Platform, Plain ..... $2.10@$2.25
Union Platform, Stpd ..... $2.15@$2.50
For double beam, add 50¢ each.
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
Reading Hardware Co ..... 50&5%
The Standard Portables 40%
The Standard R. R. & Wagon ..... 50&10%

SCREWS—

Coach and Lag—

Lag, Cone Point ..... 80&5%
Coach, Gimlet Point ..... 80&2½%

Jack—

Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head ..... 50&10@50&10&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10@80&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron) 80%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&5@70&10&10%
Hex. Hd. Cap ..... 70&10&5@70&10&10%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron ..... 87½&5@..%
Round Head, Iron ..... 85&5@..%
Flat Head, Brass ..... 80&5@..%
Round Head, Brass ..... 77½&5@..%
Flat Head, Bronze ..... 75&5@..%
Round Head, Bronze ..... 72½&5@..%
Drive Screws ..... 87½&5@..%

SHOES, HORSE, MULE, &c.—

F.o.b. Pittsburgh:
Iron ..... *per keg.* $4.10
Steel ..... *per keg.* $3.85

SHOVELS AND SPADES—

Association List ..... 40&10@50%

SIEVES—

Seamless Metallic—

	Per Dozen.			
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.25	1.25	1.25	1.35

Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... *doz.* $0.90@0.95
Mesh 20, Nested ..... *doz.* $1.00@1.05
Mesh 24, Nested ..... *doz.* $1.40@1.50

SKEINS, WAGON—

Cast Iron ..... 70@70&10%
Steel ..... 35@40%

SPRINGS—

Carriage, Wagon, &c.—

	Per 100 lb.
1¼ in. and Wider:	
Black	$4.75@$5.00
Half Bright	$4.75@$5.00
Bright	$5.25@$5.50
Painted Seat Springs:	
1½ x 2 x 26	*per pair* .45@47¢
1½ x 3 x 28	*per pair* .68@71¢

STOCKS AND DIES—

Blacksmiths' ..... 50@50&10%
Curtis Rev'ble R'chet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plate 25%

TACKS, FINISHING NAILS, &c.

American Carpet Tacks ..... 90&20@—%
American Cut Tacks ..... 90&20@—%
Swedes' Cut Tacks ..... 90&20@—%
Swedes' Upholsterers' ..... 90&30@—%
Gimp Tacks ..... 90&30@—%
Lace Tacks ..... 90&30@—%
Trimmers' Tacks ..... 90&20@—%
Looking Glass Tacks ..... 65@—%
Bill Posters' and Railroad Tacks ..... 90&40@—%
Hungarian Nails ..... 75&10@—%
Finishing Nails ..... 70@—%
Trunk and Clout Nails ..... 75@—%
NOTE.—The above prices are for Straight Weights.
See also Nails, Wires.

Double Pointed—

Double Pointed Tacks ..... 90&10&10&10&10%

TAPES, MEASURING—

American Asses' Skin ..... 50&5@60%
Patent Leather ..... 25@30&5%
Steel ..... 35@40%
Chesterman's ..... 30@33⅓%
Keuffel & Esser Co.:
Favorite, Ass Skin 50%
Favorite, Duck and Leather ..... 25&10%
Metallic and Steel, lower list, 35@35@5%;
Pocket ..... 35&10%
Lufkin's:
Asses' Skin ..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather ..... 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc 25%
Chesterman's Steel, No. 1638L, etc 35%

TRUCKS, WAREHOUSE, &c.—

McKinney Trucks ..... each, net $10.00

VISES—

Solid Box ..... 60&60@10%

Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00 ..... 20%
Merrills 25%
Millers Falls Oval Slide Pattern ..... 60&10%
Parker's:
Victor, 20@25%; Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Trojan's ..... 60&25%

Pipe—

Curtis & Curtis Malleable 25%
Fisher & Norris, No. 0, $16.00; No. 1, $24.00.
Parker's Combination:
87 Series, 60%; 187 Series, 00 & 5%; No. 870, 40%.
Competitive Combination's ..... 65&70%

VISES, WOODWORKERS'—

Fisher Bench and Woodworkers' Special, No. 1 ..... $12.50

WASHERS—

Leather, Axle—

Solid ..... 85&10@90%
Patent ..... 85@85&10%
Coil: ⅜ 9¢ | 1 10¢ | 1⅛ 11¢ | 1¼ 14¢ inch. per box

Iron or Steel—

Size bolt	5-16	⅜	½	⅝	¾
Washers	$5.15	4.25	3.15	2.95	2.85

The above prices are based on 6.25 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

WHEELS, GRINDING—

Pike Mfg. Co., Corundum, 65%; Emery 75%

WIRE—

Market and Stone Wire in Bundles—

Bright and Annealed:
9 and coarser 80%
10 to 18 ..... 80&10%
19 to 26 ..... 80&10&2½%
27 to 36 ..... 80&5%
Galvanized:
9 and coarser ..... 75&10%
10 to 16 ..... 75&10%
17 to 26 ..... 72½&10%
27 to 36 ..... 72½%
Coppered:
9 and coarser ..... 75&10%
10 to 26 ..... 75&10%
27 to 36 ..... 70&10&5%
Tinned:
6 to 18 ..... 75&10&10%
Brass ..... 14¾¢ lb., base
Copper ..... 14¼¢ lb., base
Cast Steel Wire ..... 50¢

Spooled Wire—

Annealed and Tinned ..... 70&10&5%
Brass and Copper ..... 60&10&5%
Retailers' Assortments, per box ..... $2.25@$2.50

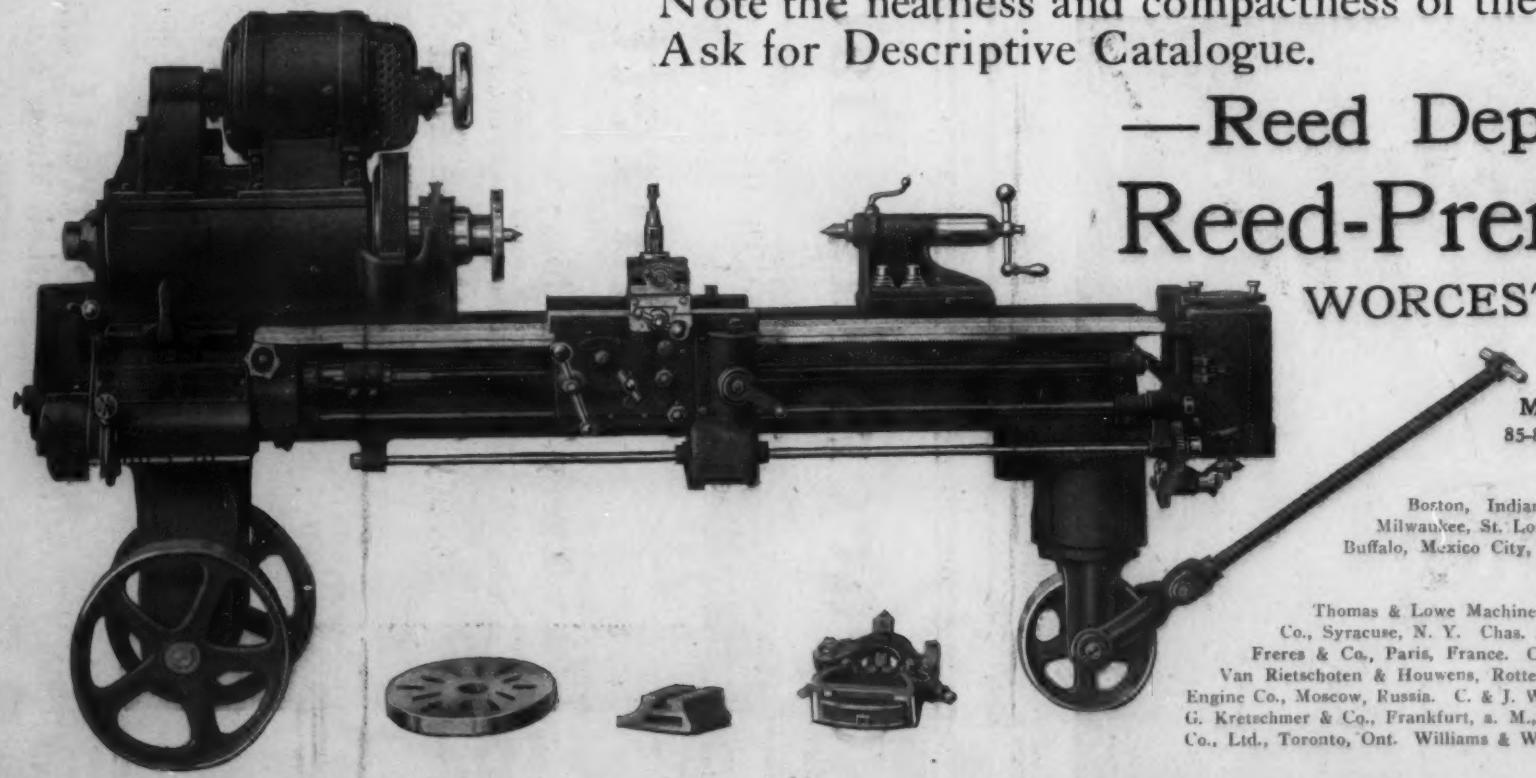
WRENCHES—

Agricultural ..... 80&5@80&10%
Alligator or Crocodile ..... 75@80¢
Baxter Pattern S Wrenches ..... 70&5@70&10¢
Drop Forged S ..... 50&10@60%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut ..... 50&10%
Combination Black ..... 50&10%
Merrick Pattern ..... 50&10%
Steel Handle Screw ..... 50&10%
Wood Handle Screw ..... 50&10%
Coes' Genuine Knife Hdl ..... 50@50&10%
Coes' Genuine Steel Hdl ..... 50@50&10%
Coes' Genuine Key Model ..... 50@50&10%
Coes' Genuine Hammer Handle ..... 50@50&10%
Coes' "Mechanics'" ..... 50&10@50&10&10%
Hercules 70%
Whitman & Barnes Mfg. Co.:
Acme ..... 60&10%
Alligator Pattern, Bull Dog 75%
Machinist, case lots 60%
Less than case lots ..... 50&10%
Railroad Special, case lots ..... 50&10%
Less than case lots 50%
Star Mfg. Co. Wrenches:
Elgin, Alligator Pattern, Adjustable
Elgin Wrenches only ℔ doz $12.00
Elgin Rethreading Attachment, with one die ℔ doz $12.00
Elgin Extra Jaws ℔ doz $3.00
Elgin Dies assorted, ℔ doz $6.00
Elgin Boxed Sets each $5.30
Case lots 50%
Star, Adjustable Pipe, case lots each 10 in. $2.25; 14 in. $3.00; 18 in. $4.00; 24 in. $6.00 ..... 50&10&10%
Agrippa Chain Pipe ..... 50@10%
Vulcan-Bijaw Chain Pipe 50%
Wizard Adjustable Ratchet, per doz $15.00
Shark Adjustable Pipe ..... 50&10%

REED

14" PORTABLE MOTOR DRIVEN LATHE

This 14" Electrically Driven Portable Engine Lathe is especially designed for Railroad Work. It is complete with Screw Cutting Attachment and Quick Change Gear Box. Note the neatness and compactness of the Motor Drive. Ask for Descriptive Catalogue.



—Reed Department—

Reed-Prentice Co.

WORCESTER, MASS.

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85-87-89 Liberty Street, New York, N. Y.

Boston, Indianapolis, Philadelphia, Cleveland, Chicago, Milwaukee, St. Louis, Los Angeles, Pittsburg, San Francisco, Buffalo, Mexico City, Detroit, Yokohama, Japan.

AGENTS:

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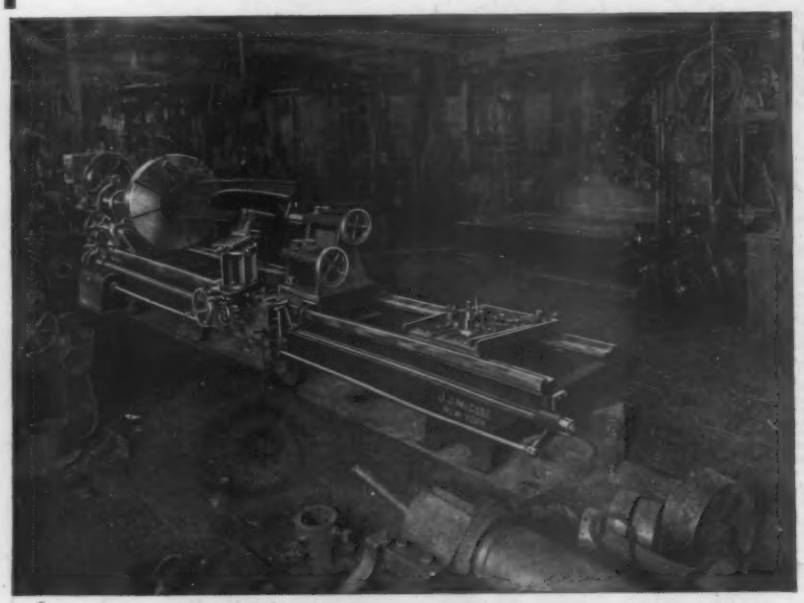
The Lathes Change

quickly when you want them—as the work changes—over and over again.

If you want a 48-inch Lathe, you'd pay $1,000 more for the capacity in any other big Lathe. And you'd lack the capacity of the 26-inch Swing you get in the **McCabe "2-in-1" DOUBLE-SPINDLE LATHE.** It has reserve power and capacity beyond any Lathe built.



Handling Engine-Frame, 12-ft. out from Face-Plate on McCabe's "2-in-1" Double-Spindle Lathe, 26 48-in. Swing.

SHOP-SERVICE — that's the important part of the part McCabe's **"2-in-1"** Lathe plays in a shop like yours. Book illustrates and describes how the **"2-in-1"** Lathe answers many purposes.

J. J. McCabe

"The Double-Spindle Lathe Man"

30 Church Street

NEW YORK CITY

Concerning Hack Saws

The best is recognized by its rapid cutting and lasting qualities. The best is recognized by the name

Starrett

Every Tooth Cuts;

Think how much more work this saw does than one having one tooth in ten doing the cutting.

Every Tooth Has the Right Shape:

The square cutting edges are at the angle which will cut fastest in the metal for which the blade is made.

Every Tooth Has the Right Set:

You save material because the set is only enough to clear freely. You save strength because you cut into fine chips the smallest amount of metal.

Before buying consult our Catalog No. 19AA—it's yours for the asking.

The L. S. Starrett Company

Athol, Mass.

42-41

NEW YORK LONDON CHICAGO

Look At It

Water Emery Grinder

2″ x 24″ Wheel

Simplest in Construction — Most Efficient in Operation

No Valves—No Pumps
Always ready for use

THE float is guaranteed rust-proof; there is no twitching, straining or balancing of the body to throw water on the wheel; simply resting the foot on the treadle, a most natural position for operator. No dipper full of water in this grinder, but a tank full that lasts for days without refilling.

Send for PRICE (Sure to interest you)

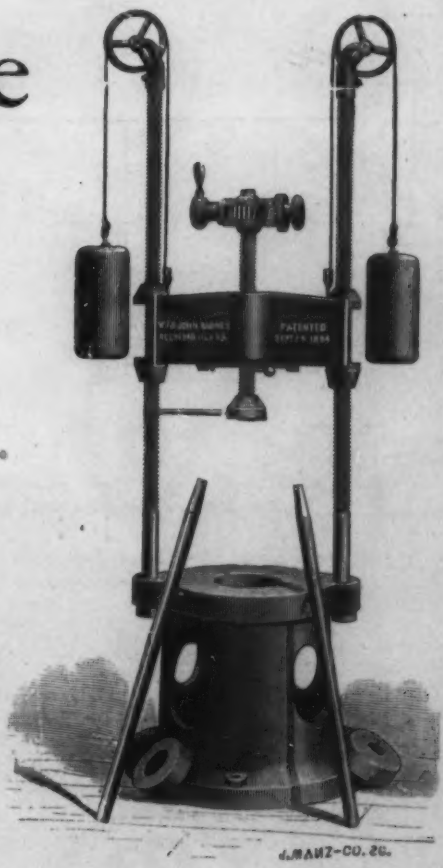
Barnes Adjustable Screw Press

Quick Work — Strong — Practical

Built In Three Sizes
20 to 50 Tons Capacity

PULLEYS and Gear Wheels pressed on Shafts by this machine are more securely fixed and less liable to be out of true.

If you are interested in modern methods of doing work in the machine shop, send for our Catalog, which describes more fully the practical points of this tool. We also make Upright Drills, Gang Drills, Horizontal Drills.



TRADE W.F. AND J.B. MARK

W. F. & John Barnes Company

(Established 1872)

69 Ruby Street :: :: Rockford, Illinois

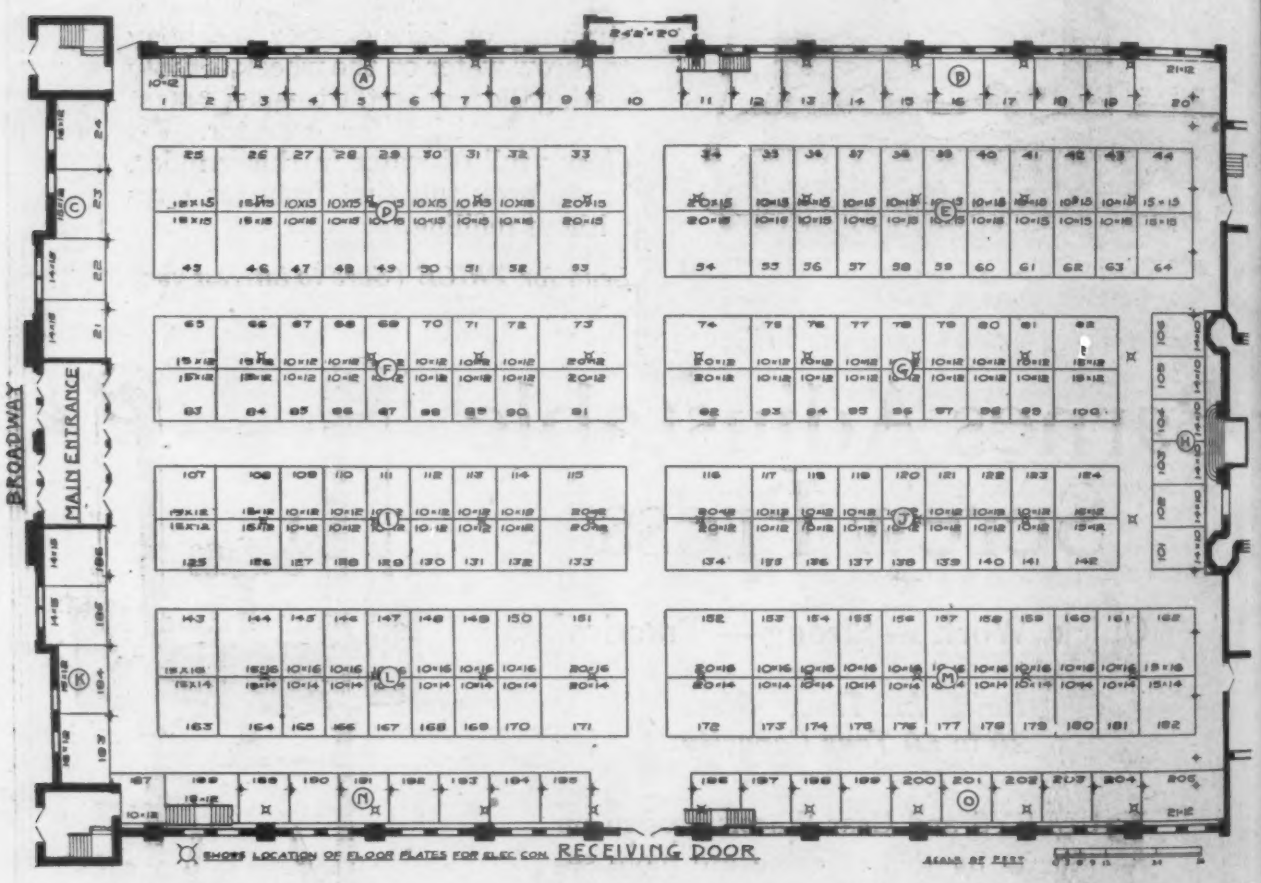
Foreign Agents:—Chas. Churchill & Co., London. Fenwick Frères, Paris. Heinrich Dreyer, Berlin. F. W. Horne, Yokohama.

THE 1912 Exhibit of Foundry and Machine Shop Equipment, to be held in conjunction with the Annual Conventions of The American Foundrymen's Association, The American Institute of Metals, and The Associated Foundry Foremen, at Buffalo, New York, the week of September 23, offers unusual opportunities both to the buyer and to the seller.

Here the buyer will find installed the largest exhibit ever made of machines and equipment for this trade, affording him opportunity to inspect the latest and best that is manufactured.

The manufacturer and dealer who sells to this trade will find in attendance at these Conventions and Exhibits many hundred proprietors, managers, superintendents, and foremen, who have come at their own expense to see this Exhibit before buying, that they may *buy right*.

At former exhibits thousands of dollars worth of orders have been taken on the grounds. These sales, together with advertising advantages, make exhibiting pay.



Floor Plan of Broadway Exposition Building, Buffalo, N. Y., and layout of exhibit space of the 1912 Exhibit of the Foundry and Machine Exhibition Company, September 23 to 27 inclusive.

The price of space is 50 cents per square foot. This price includes dividing railings, signs (bearing name and address of exhibitors), general decorations, light, etc. There will be no charge for compressed air and electric power for operating exhibits. The Exhibition Company will contract to receive and deliver shipments to the exhibitor's space at 6 cents per cwt. Mechanics and laborers will be furnished at reasonable prices, and prices for furniture will be quoted on request.

For further information address

FOUNDRY AND MACHINE EXHIBITION CO.

C. E. HOYT, Secretary and Manager **Lewis Institute Building**

CHICAGO, ILLINOIS

PITTSBURGH EXHIBIT OF THE FOUNDRY AND MACHINE EXHIBITION CO., MAY, 1911

MAIN BUILDING, LOOKING EAST

CORNER OF MECHANICAL HALL

GARVIN
Duplex Horizontal
DRILLS

Strong and Accurate

No. O Duplex Horizontal Drills
Use Code—Caitiff

THE machines are well adapted for drilling holes on opposite ends of work on the same axis and especially for all manufacturing work requiring drilling, counterboring, hollow milling and facing.

Stops are provided on each head for depth, and an adjustable nut which can set each head separately, to a fineness, for facing operations.

No. O Machine has a capacity of a ½" drill—Also made with lever feed.

Immediate Delivery

FOR FURTHER INFORMATION ASK YOUR DEALER or WRITE US DIRECT

Send for Circular No. 144

MANUFACTURED BY

The Garvin Machine Co.

Spring and Varick Sts. 45 Years in New York City

VISITORS WELCOME

Compare Your Method With This

The Acme Automatic is a Multiple Spindle Screw Machine. It uses all the tools at once, and completes a piece (with from six to eight tooling cuts on it) in one operation.

It will size and ream more accurately than can be done with ordinary screw machine tools, and do it without adding to the time or cost.

It can be used *to finish* work usually handled on milling or drilling machines after it is made on a screw machine.

It produces more parts, better finished parts, and more complete parts than the old methods.

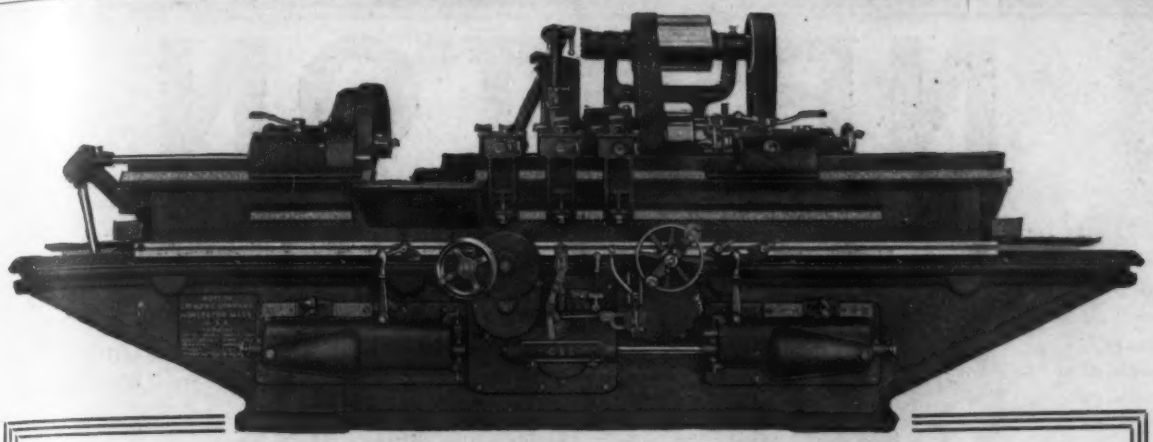
Send for Catalog M2.

The National-Acme Mfg. Co.

Automatic Screw Machines and Their Products

Cleveland, Sixth City

NEW YORK, BOSTON, CHICAGO,
DETROIT, MONTREAL, ATLANTA.



Rigid, Heavy, Grinding Machines

are necessary where a high production of accurate cylindrical work must be accomplished in an economical way.

Norton Grinding Machines

are so designed and constructed that these results are readily obtainable. They are stock removing machines—not simply polishing machines, a fact which is not fully appreciated by many manufacturers. This means that work can be handled following the rough turning on the lathe, and the finishing to size performed in a quick, certain and easy manner.

Illustrating our argument, we can mention a case where cast iron arms of milling machines were first rough turned on the lathe to a 32d of finished diameter.

Following this operation, the work of finishing was performed on a Norton Grinding Machine to the limit of .001 of an inch. All told, the saving in time over former methods employed was 20 minutes.

Such time savings are common to "The Norton Way," and can probably be made in your shops.

We will be glad to discuss your grinding problems with you. Write for catalog N-8.

NORTON GRINDING COMPANY

Worcester, Mass.

Chicago Store: 11 North Jefferson Street

AGENTS:—Vonnegut Machinery Co., Indianapolis. Robinson, Cary & Sands Co., St. Paul and Duluth. Manning, Maxwell & Moore, St. Louis, Philadelphia. Prentiss Tool & Supply Co., New York, Boston, Buffalo, Rochester, Syracuse, Scranton. Motch & Merryweather Machinery Co., Cleveland, Detroit, Cincinnati and Pittsburg. The Canadian Fairbanks Co., Montreal, Toronto, Vancouver. Alfred Herbert, Ltd., Coventry, England; Paris, France and Milan, Italy. Schuchardt & Schutte, Vienna, Prague, Budapest. F. W. Horne, Yokohama, Japan. 190N

NEWTON

(REGISTERED TRADE-MARK)

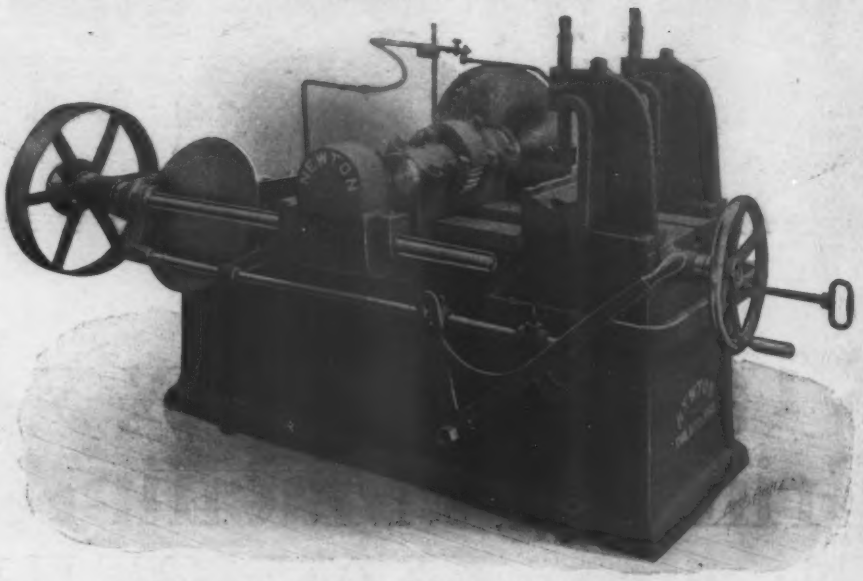
Crank Slotting Machines

Rotary Planing Machines

Keyseat Milling Machines

Die Sinking Machines

Locomotive Cylinder Boring Machines



Vertical and Horizontal and Multiple Spindle Milling Machines

Bridge-chord Boring Machines

Portable Boring Drilling Milling and Slotting Machines

Heavy Spur Gear Cutting Machines

NO. 2 NEW DESIGN BAR COLD SAW

Diameter of blade 20", capacity rounds up to 5½", squares up to 5" and 10" I-Beams in vertical position on square or mitre cut
This is the smallest machine on the market capable of efficiently carrying an inserted tooth saw blade.

NEWTON MACHINE TOOL WORKS, Inc.

PHILADELPHIA, U. S. A.

FOREIGN REPRESENTATIVES:

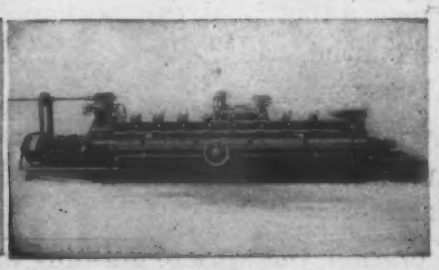
Berlin: Heinrich Dreyer. Vienna: Rudolf Salzer. Italy, Spain, Switzerland, Belgium and France: Fenwick Frères & Co., Paris. Williams & Wilson, Montreal, Canada.

PRECISION GRINDING MACHINES

Landis Plain Grinding Machines

10" x 20", 10" x 30", 12" x 32", 12" x 42", 12" x 66", 12" x 96", 12" x 120", 16" x 72".

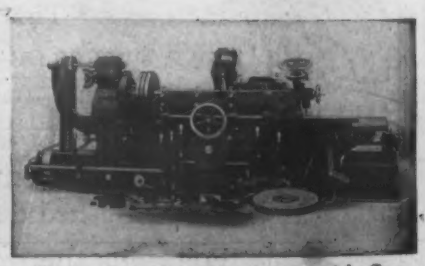
These machines are intended for finishing straight and taper spindles, shafts, rolls, tubing and all other work within their range which can be revolved on dead centers.



Large Type

Standard sizes: 20" x 96", 20" x 120", 20" x 144", 20" x 168".

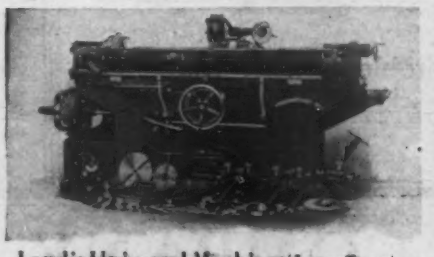
These manufacturing machines are adapted for straight and taper cylindrical shafts, spindles, pistons, corliss valves, plungers, tubing and are especially desirable for grinding hardened steel and iron rolls.



Plain Grinding Machines with Gap

These are our 16" and 20" swing Plain Machines built with gap in the bed to suit the location of the projection on the work.

Largest exclusive manufacturers of grinding machines in the world

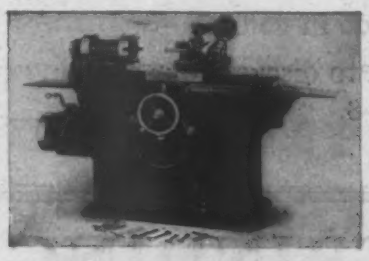


Landis Universal Machines (Large Type)

No. 1 (10" x 20"), No. 1½ (10" x 30"), No. 2 (12" x 32"), No. 3 (12" x 42"), No. 4 (12" x 66").

Nos. 2, 3, 4 (also built with 16" swing) are used for finishing tools and a variety of straight or taper parts (both external and internal) as are common to the tool-room, machine shop, railroad shop, etc.

Attachments such as magnetic chuck, gear cutter attachments, cam grinding attachment, side mill grinding attachment, etc., can be used on these machines.



Landis Internal Grinding Machines

This machine is intended for straight and taper internal grinding. The fixtures for these machines will grind holes ¼" diameter or larger and up to 12" long.

Landis Crank Grinding Machines

These machines are designed for grinding single or multiple throw crank shafts used in gas and small steam engines.

Descriptive and Illustrated Literature for Each Size.

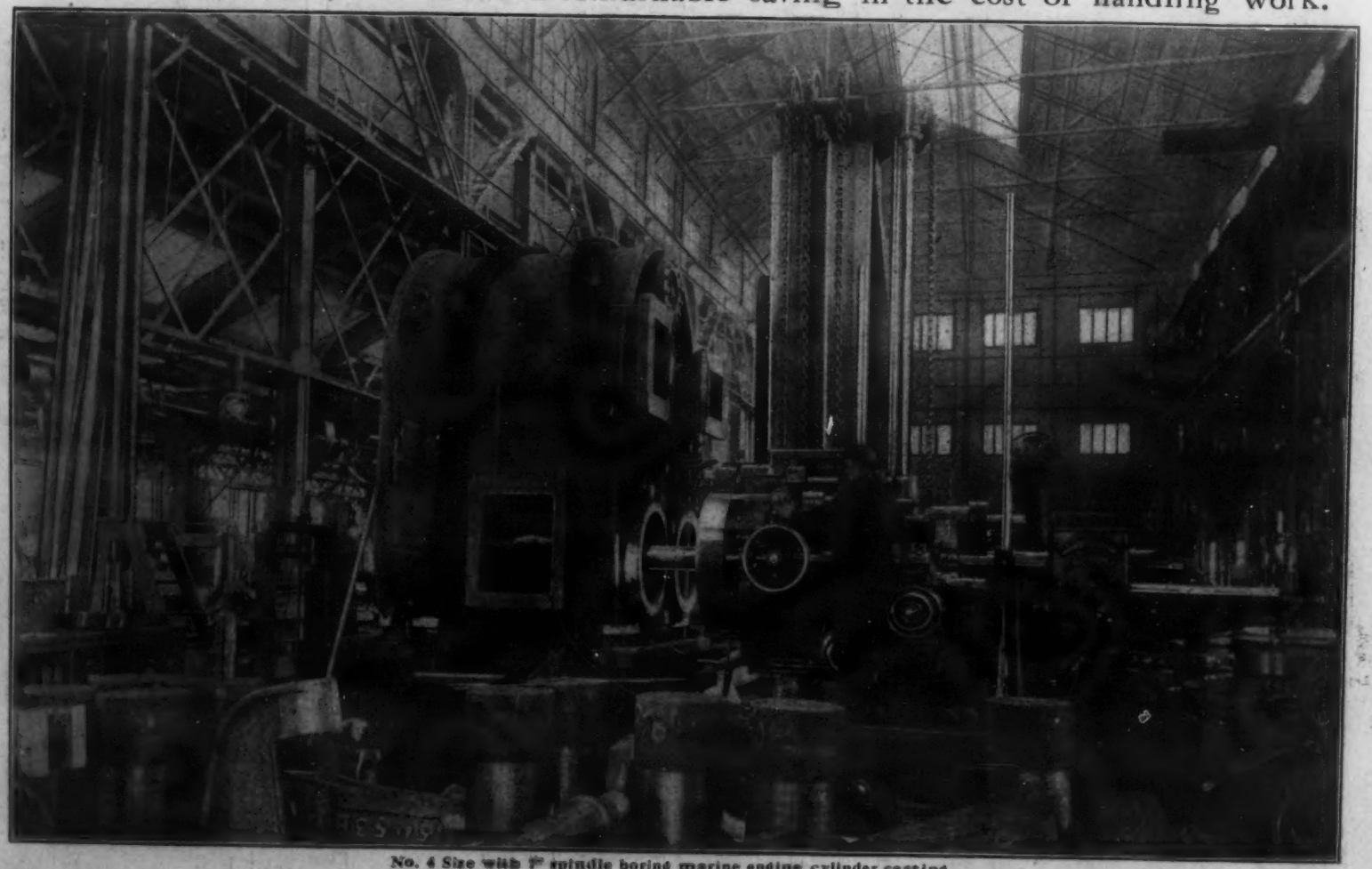
LANDIS TOOL CO.

WAYNESBORO, - - PENNA., U. S. A.

Horizontal Drilling, Boring and Milling Machines

For Machining Large And Irregular Work At *One Setting*

This type machine faces, drills, bores, taps and mills, performing all these operations in minimum time, and shows a remarkable saving in the cost of handling work.



No. 4 Size with 7" spindle boring marine engine cylinder casting

Standard Sizes

No. 0 with 3½" Spindle
No. 1 with 4 " Spindle
No. 2 with 5 " Spindle
No. 3 with 6 " Spindle
No. 4 with 7 " Spindle

Some Valuable Features

1. **Centralized Control;** all movements fast and slow by hand and power; are **non-Conflicting,** and are made from platform upon which is the motor control and access to all the operating means.

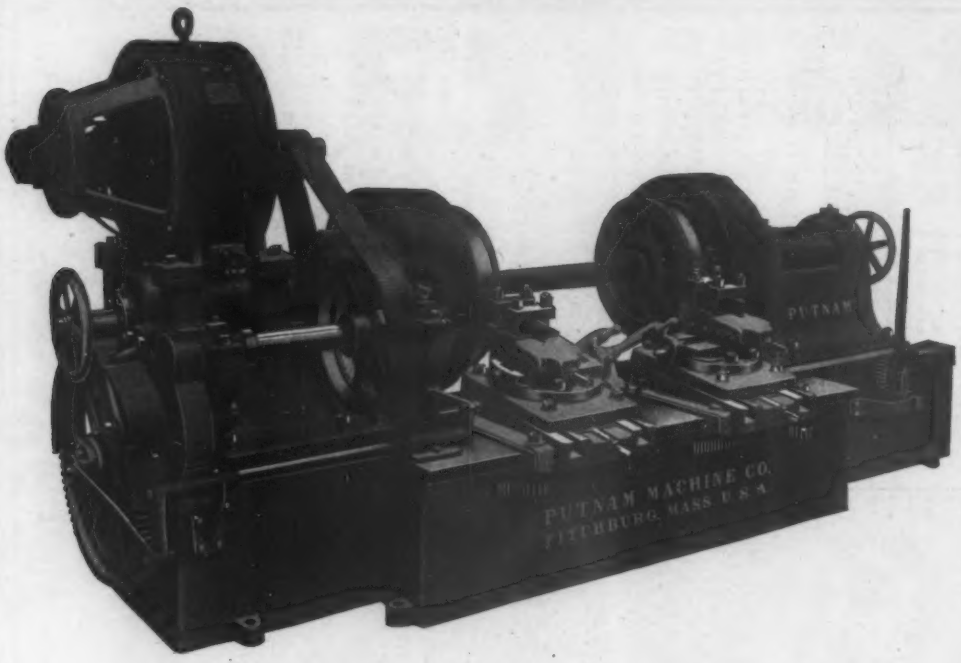
2. **The narrow guiding fits** of the column to runway, and saddle to column, reduce the friction of the machine, the strain on the feed mechanism, and retain alignment to moving parts not otherwise possible.

3. **Additional Friction Device** for retaining the spindle in its horizontal position against the pressure of the cut when milling.

4. **No belts used,** all gear driving and feeding mechanism. All gears entirely covered.

5. All feeds are driven by the spindle, are always within a given ratio to the spindle speeds.

DETRICK & HARVEY MACHINE CO., OPEN SIDE PLANERS AND VERTICAL BORING MILLS **Baltimore, Md., U. S. A.**



MANNING MAXWELL & MOORE INC. M&M TRADE MARK

A 42" PUTNAM STEEL TIRE WHEEL LATHE WILL SAVE YOU MONEY.

NOTICEABLE FEATURES: QUICK ADJUSTMENT; HEAVY CUTS AT COARSE FEEDS; AUTOMATIC DRIVING DOGS; TAIL STOCK OPERATED BY HAND OR POWER.

Write for Particulars.

SOLE AGENTS

MANNING, MAXWELL & MOORE

INCORPORATED

85-87-89 Liberty Street, New York

MACHINE SHOP AND FOUNDRY EQUIPMENT OF EVERY DESCRIPTION

CHICAGO PHILADELPHIA BOSTON ST. LOUIS PITTSBURG CLEVELAND
SAN FRANCISCO BUFFALO DETROIT MILWAUKEE Yokohama, JAPAN

9"-11"-13" SWING
4-5-6-7-8-10-ft. BEDS

ACCURATE WORK and "STAR" LATHES

are invariably linked together in the mind of the machinist who has "tried out" the "Star" Lathe. They are made for turning out quantities of small work quickly and accurately. Don't tie up big and expensive lathes with small work; they are made for large pieces. It's economy to use "Star" Lathes.

Send for Catalog B.

The SENECA FALLS MFG. CO.

255 Water Street, Seneca Falls, N. Y., U. S. A.

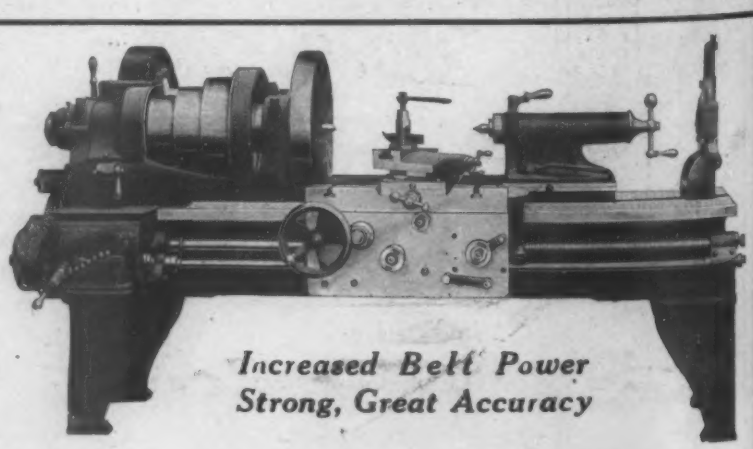
201A

INSTANT FEED CHANGES FOR ALL REQUIREMENTS

This 22-in. Heavy Pattern Bradford Lathe has ready means for instantly changing the feed to meet any and all requirements of the up-to-date shop.

The bed and all working parts are extra strong. There's not a possible chance of springing or chattering in operation.

Catalog?



Increased Belt Power
Strong, Great Accuracy

THE BRADFORD MACHINE TOOL CO., CINCINNATI, OHIO, U. S. A.

There Must be Merit in a Wheel that Grinds 300 Piston Rings in 9 Hours

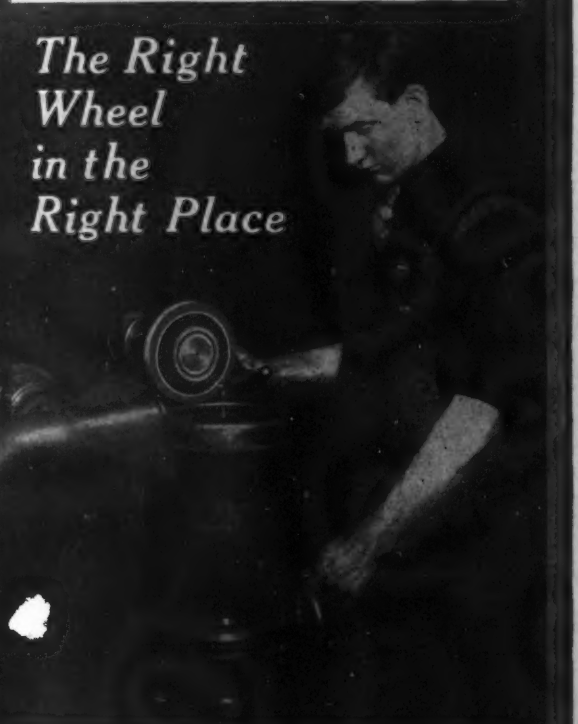
But this is just an everyday evidence of the cutting qualities of

Carborundum

The piston rings are of cast iron, 7 inches in diameter, ¼-inch thick—.015 inch is left for grinding.—The *Carborundum Wheel* fairly eats away the stock—yet it holds its shape—shows long life.

You may be grinding piston rings to-morrow or the next day—just remember that you can do better work—more work with—

The Right Wheel in the Right Place



The Carborundum Company
Niagara Falls, N. Y.
New York Chicago Boston
Philadelphia Pittsburgh
Cleveland Cincinnati Milwaukee
London, Eng.

NORTON

Alundum

Are you interested in grinding

SPECIAL ALLOY STEELS
HIGH CARBON STEELS
HIGH SPEED STEELS?

We are making Alundum Grinding Wheels that are especially adapted for this work.

Alundum Wheels are highly efficient under a wide range of conditions. They are far superior to any other wheel for grinding steel of any kind, in any form.

Crystolon

If your problem is grinding

CAST IRON
CHILLED IRON
BRASS OR BRONZE

the most efficient tool to use is a Crystolon Grinding Wheel.

This cutting material is remarkably successful for grinding the above metals. Let us work on your grinding proposition until you have reached highest efficiency.

NORTON COMPANY
WORCESTER, MASS.

Alundum Plant, Niagara Falls, N. Y.
Crystolon Plant, Chippawa, Canada
New York Store, 151 Chambers St.
Chicago Store, 11 N. Jefferson St.

208

In a Recent Test of
Internal Grinding
on Automobile Cones & Gears

The following results were obtained:

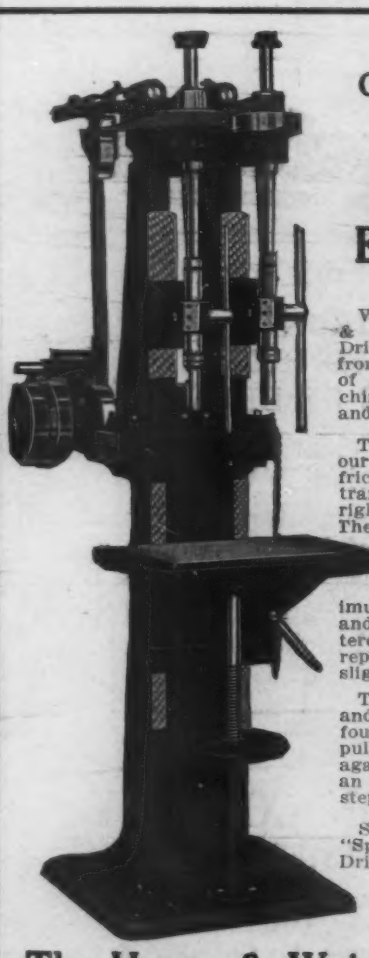
Best record other makes - - - - - 35 Cones
Pittsburgh Emery Wheel - - - - - 86 Cones

On Steel Forgings

Time on other makes per piece - - 3 minutes
Time on Pittsburgh Wheel per piece - - 2 minutes
Life of Pittsburgh Wheel 1½ times the other makes.

Why Is This?

PITTSBURGH EMERY WHEEL COMPANY
GRINDING ENGINEERS
603-604 Park Building -:- PITTSBURGH, PENNA.



Chapter No. 4
ON
DRILLING EFFICIENCY

We guarantee the Henry & Wright Ball Bearing Drilling Machine to do from 2 to 4 times the work of a plain bearing machine of the same size and power.

This is possible because our machine eliminates friction and waste. It transmits all the power right down to the drill. The bearings are the finest German balls running in carefully ground races Wear, reduced to the minimum, comes on the cones and cases which are interchangeable and can be replaced from stock at slight cost.

The patented Belting and Idler system gives four speeds on two step pulleys with a single belt against three speeds on an ordinary three or four step pulley and two belts.

Send for our chart "Speeds and Feeds for Drilling."

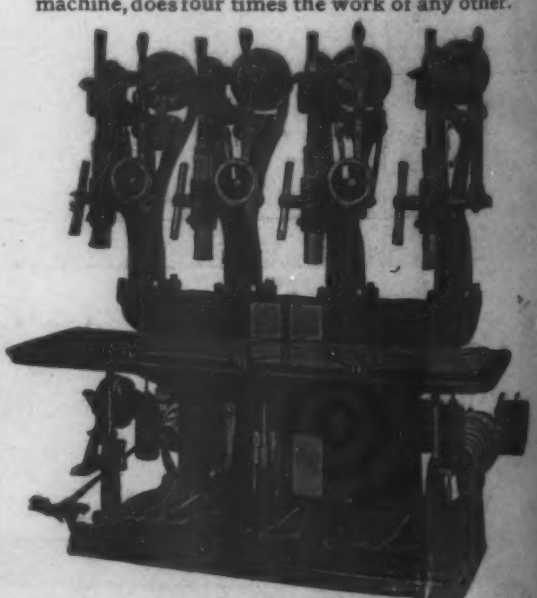
(Continued next week.)

The Henry & Wright Mfg. Co.
760 Windsor Street HARTFORD, CONN.

THE ROCKFORD DRILLING MACHINE Co. ROCKFORD ILL., U.S.A.

ROCKFORD DRILLING MACHINES

produce maximum output with least consumption of power. Many operations that are now performed on chucking lathes can be accomplished with this great tool. One operator, one machine, does four times the work of any other.



ROCKFORD DRILLING MACHINE CO.
ROCKFORD, ILLINOIS